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(b) Except as provided in § 31.17(b), allowable weight tolerances during flight testing are +5 percent and −10 percent.

[Amdt. 31–4, 45 FR 60179, Sept. 11, 1980]

§ 31.14 Weight limits.

(a) The range of weights over which the balloon may be safely operated must be established.

(b) *Maximum weight.* The maximum weight is the highest weight at which compliance with each applicable requirement of this part is shown. The maximum weight must be established so that it is not more than—

(1) The highest weight selected by the applicant;

(2) The design maximum weight which is the highest weight at which compliance with each applicable structural loading condition of this part is shown; or

(3) The highest weight at which compliance with each applicable flight requirement of this part is shown.

(c) The information established under paragraphs (a) and (b) of this section must be made available to the pilot in accordance with § 31.81.

[Amdt. 31–3, 41 FR 55474, Dec. 20, 1976]

§ 31.16 Empty weight.

The empty weight must be determined by weighing the balloon with installed equipment but without lifting gas or heater fuel.

[Amdt. 31–4, 45 FR 60179, Sept. 11, 1980]

§ 31.17 Performance: Climb.

(a) Each balloon must be capable of climbing at least 300 feet in the first minute after takeoff with a steady rate of climb. Compliance with the requirements of this section must be shown at each altitude and ambient temperature for which approval is sought.

(b) Compliance with the requirements of paragraph (a) of this section must be shown at the maximum weight with a weight tolerance of +5 percent.

[Amdt. 31–4, 45 FR 60179, Sept. 11, 1980]

§ 31.19 Performance: Uncontrolled descent.

(a) The following must be determined for the most critical uncontrolled descent that can result from any single failure of the heater assembly, fuel cell system, gas value system, or maneuvering vent system, or from any single tear in the balloon envelope between tear stoppers:

(1) The maximum vertical velocity attained.

(2) The altitude loss from the point of failure to the point at which maximum vertical velocity is attained.

(3) The altitude required to achieve level flight after corrective action is inititated, with the balloon descending at the maximum vertical velocity determined in paragraph (a)(1) of this section.

(b) Procedures must be established for landing at the maximum vertical velocity determined in paragraph (a)(1) of this section and for arresting that descent rate in accordance with paragraph (a)(3) of this section.

[Amdt. 31–4, 45 FR 60179, Sept. 11, 1980]

§ 31.20 Controllability.

The applicant must show that the balloon is safely controllable and maneuverable during takeoff, ascent, descent, and landing without requiring exceptional piloting skill.

[Amdt. 31–3, 41 FR 55474, Dec. 20, 1976]

Subpart C—Strength Requirements

§ 31.21 Loads.

Strength requirements are specified in terms of limit loads, that are the maximum load to be expected in service, and ultimate loads, that are limit loads multiplied by prescribed factors of safety. Unless otherwise specified, all prescribed loads are limit loads.

§ 31.23 Flight load factor.

In determining limit load, the limit flight load factor must be at least 1.4.

§ 31.25 Factor of safety.

(a) Except as specified in paragraphs (b) and (c) of this section, the factor of safety is 1.5.

(b) A factor of safety of at least five must be used in envelope design. A reduced factor of safety of at least two may be used if it is shown that the selected factor will preclude failure due to creep or instantaneous rupture from