(1) The accessibility, ease, and simplicity of operation of all necessary flight, power, and equipment controls, including emergency fuel shutoff valves, electrical controls, electronic controls, pressurization system controls, and engine controls.

(2) The accessibility and conspicuity of all necessary instruments and failure warning devices such as fire warning, electrical system malfunction, and other failure or caution indicators. The extent to which such instruments or devices direct the proper corrective action is also considered.

(3) The number, urgency, and complexity of operating procedures with particular consideration given to the specific fuel management schedule imposed by center of gravity, structural or other considerations of an airworthiness nature, and to the ability of each engine to operate at all times from a single tank or source which is automatically replenished if fuel is also stored in other tanks.

(4) The degree and duration of concentrated mental and physical effort involved in normal operation and in diagnosing and coping with malfunctions and emergencies.

(5) The extent of required monitoring of the fuel, hydraulic, pressurization, electrical, electronic, deicing, and other systems while en route.

(6) The actions requiring a crewmember to be unavailable at his assigned duty station, including: observation of systems, emergency operation of any control, and emergencies in any compartment.

(7) The degree of automation provided in the aircraft systems to afford (after failures or malfunctions) automatic crossover or isolation of difficulties to minimize the need for flight crew action to guard against loss of hydraulic or electric power to flight controls or to other essential systems.

(8) The communications and navigation workload.

(9) The possibility of increased workload associated with any emergency that may lead to other emergencies.

(10) Incapacitation of a flight crewmember whenever the applicable operating rule requires a minimum flight crew of at least two pilots.

(c) *Kind of operation authorized*. The determination of the kind of operation authorized requires consideration of the operating rules under which the airplane will be operated. Unless an applicant desires approval for a more limited kind of operation. It is assumed that each airplane certificated under this Part will operate under IFR conditions.

[Amdt. 25–3, 30 FR 6067, Apr. 29, 1965]

APPENDIX E TO PART 25

I—Limited Weight Credit For Airplanes Equipped With Standby Power

(a) Each applicant for an increase in the maximum certificated takeoff and landing weights of an airplane equipped with a type-certificated standby power rocket engine may obtain an increase as specified in paragraph (b) if—

(1) The installation of the rocket engine has been approved and it has been established by flight test that the rocket engine and its controls can be operated safely and reliably at the increase in maximum weight; and

(2) The Airplane Flight Manual, or the placard, markings or manuals required in place thereof, set forth in addition to any other operating limitations the Administrator may require, the increased weight approved under this regulation and a prohibition against the operation of the airplane at the approved increased weight when—

(i) The installed standby power rocket engines have been stored or installed in excess of the time limit established by the manufacturer of the rocket engine (usually stenciled on the engine casing); or

(ii) The rocket engine fuel has been expended or discharged.

(b) The currently approved maximum takeoff and landing weights at which an airplane is certificated without a standby power rocket engine installation may be increased by an amount that does not exceed any of the following:

(1) An amount equal in pounds to 0.014 IN, where I is the maximum usable impulse in pounds-seconds available from each standby power rocket engine and N is the number of rocket engines installed.

(2) An amount equal to 5 percent of the maximum certificated weight approved in accordance with the applicable airworthiness regulations without standby power rocket engines installed.

(3) An amount equal to the weight of the rocket engine installation.

(4) An amount that, together with the currently approved maximum weight, would equal the maximum structural weight established for the airplane without standby rocket engines installed.

II—Performance Credit for Transport Category Airplanes Equipped With Standby Power

The Administrator may grant performance credit for the use of standby power on transport category airplanes. However, the performance credit applies only to the maximum certificated takeoff and landing weights, the takeoff distance, and the takeoff paths, and may not exceed that found by the Administrator to result in an overall level of safety in the takeoff, approach, and

landing regimes of flight equivalent to that prescribed in the regulations under which the airplane was originally certificated without standby power. For the purposes of this appendix, ''standby power'' is power or thrust, or both, obtained from rocket engines for a relatively short period and actuated only in cases of emergency. The following provisions apply:

(1) *Takeoff; general.* The takeoff data prescribed in paragraphs (2) and (3) of this appendix must be determined at all weights and altitudes, and at ambient temperatures if applicable, at which performance credit is to be applied.

(2) *Takeoff path.*

(a) The one-engine-inoperative takeoff path with standby power in use must be determined in accordance with the performance requirements of the applicable airworthiness regulations.

(b) The one-engine-inoperative takeoff path (excluding that part where the airplane is on or just above the takeoff surface) determined in accordance with paragraph (a) of this section must lie above the one-engine-inoperative takeoff path without standby power at the maximum takeoff weight at which all of the applicable air-worthiness requirements are met. For the purpose of this comparison, the flight path is considered to extend to at least a height of 400 feet above the takeoff surface.

(c) The takeoff path with all engines operating, but without the use of standby power, must reflect a conservatively greater overall level of performance than the one-engine-inoperative takeoff path established in accordance with paragraph (a) of this section. The margin must be established by the Administrator to insure safe day-to-day operations, but in no case may it be less than 15 percent. The all-engines-operating takeoff path must be determined by a procedure consistent with that established in complying with paragraph (a) of this section.

(d) For reciprocating-engine-powered airplanes, the takeoff path to be scheduled in the Airplane Flight Manual must represent the one-engine-operative takeoff path determined in accordance with paragraph (a) of this section and modified to reflect the procedure (see paragraph (6)) established by the applicant for flap retraction and attainment of the en route speed. The scheduled takeoff path must have a positive slope at all points of the airborne portion and at no point must it lie above the takeoff path specified in paragraph (a) of this section.

(3) *Takeoff distance.* The takeoff distance must be the horizontal distance along the one-engine-inoperative take off path determined in accordance with paragraph (2)(a) from the start of the takeoff to the point where the airplane attains a height of 50 feet above the takeoff surface for reciprocating-engine-powered airplanes and a height of 35 feet above the takeoff surface for turbine-powered airplanes.

(4) *Maximum certificated takeoff weights.* The maximum certificated takeoff weights must be determined at all altitudes, and at ambient temperatures, if applicable, at which performance credit is to be applied and may not exceed the weights established in compliance with paragraphs (a) and (b) of this section.

(a) The conditions of paragraphs (2)(b) through (d) must be met at the maximum certificated takeoff weight.

(b) Without the use of standby power, the airplane must meet all of the en route requirements of the applicable airworthiness regulations under which the airplane was originally certificated. In addition, turbine-powered airplanes without the use of standby power must meet the final takeoff climb requirements prescribed in the applicable airworthiness regulations.

(5) *Maximum certificated landing weights.*

(a) The maximum certificated landing weights (one-engine-inoperative approach and all-engine-operating landing climb) must be determined at all altitudes, and at ambient temperatures if applicable, at which performance credit is to be applied and must not exceed that established in compliance with paragraph (b) of this section.

(b) The flight path, with the engines operating at the power or thrust, or both, appropriate to the airplane configuration and with standby power in use, must lie above the flight path without standby power in use at the maximum weight at which all of the applicable airworthiness requirements are met. In addition, the flight paths must comply with subparagraphs (i) and (ii) of this paragraph.

(i) The flight paths must be established without changing the appropriate airplane configuration.

(ii) The flight paths must be carried out for a minimum height of 400 feet above the point where standby power is actuated.

(6) *Airplane configuration, speed, and power and thrust; general.* Any change in the airplane's configuration, speed, and power or thrust, or both, must be made in accordance with the procedures established by the applicant for the operation of the airplane in service and must comply with paragraphs (a) through (c) of this section. In addition, procedures must be established for the execution of balked landings and missed approaches.

(a) The Administrator must find that the procedure can be consistently executed in service by crews of average skill.

(b) The procedure may not involve methods or the use of devices which have not been proven to be safe and reliable.

(c) Allowances must be made for such time delays in the execution of the procedures as may be reasonably expected to occur during service.

(7) *Installation and operation; standby power.* The standby power unit and its installation must comply with paragraphs (a) and (b) of this section.

(a) The standby power unit and its installation must not adversely affect the safety of the airplane.

(b) The operation of the standby power unit and its control must have proven to be safe and reliable.

[Amdt. 25–6, 30 FR 8468, July 2, 1965]

APPENDIX F TO PART 25

Part I—Test Criteria and Procedures for Showing Compliance with § 25.853, or § 25.855.

(a) *Material test criteria*—(1) *Interior compartments occupied by crew or passengers.* (i) Interior ceiling panels, interior wall panels, partitions, galley structure, large cabinet walls, structural flooring, and materials used in the construction of stowage compartments (other than underseat stowage compartments and compartments for stowing small items such as magazines and maps) must be self-extinguishing when tested vertically in accordance with the applicable portions of part I of this appendix. The average burn length may not exceed 6 inches and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 3 seconds after falling.

(ii) Floor covering, textiles (including draperies and upholstery), seat cushions, padding, decorative and nondecorative coated fabrics, leather, trays and galley furnishings, electrical conduit, air ducting, joint and edge covering, liners of Class B and E cargo or baggage compartments, floor panels of Class B, C, D, or E cargo or baggage compartments, cargo covers and transparencies, molded and thermoformed parts, air ducting joints, and trim strips (decorative and chafing), that are constructed of materials not covered in subparagraph (iv) below, must be self-extinguishing when tested vertically in accordance with the applicable portions of part I of this appendix or other approved equivalent means. The average burn length may not exceed 8 inches, and the average flame time after removal of the flame source may not exceed 15 seconds. Drippings from the test specimen may not continue to flame for more than an average of 5 seconds after falling.

(iii) Motion picture film must be safety film meeting the Standard Specifications for Safety Photographic Film PHI.25 (available from the American National Standards Institute, 1430 Broadway, New York, NY 10018). If the film travels through ducts, the ducts must meet the requirements of subparagraph (ii) of this paragraph.

(iv) Clear plastic windows and signs, parts constructed in whole or in part of elastomeric materials, edge lighted instrument assemblies consisting of two or more instruments in a common housing, seat belts, shoulder harnesses, and cargo and baggage tiedown equipment, including containers, bins, pallets, etc., used in passenger or crew compartments, may not have an average burn rate greater than 2.5 inches per minute when tested horizontally in accordance with the applicable portions of this appendix.

(v) Except for small parts (such as knobs, handles, rollers, fasteners, clips, grommets, rub strips, pulleys, and small electrical parts) that would not contribute significantly to the propagation of a fire and for electrical wire and cable insulation, materials in items not specified in paragraphs (a)(1)(i), (ii), (iii), or (iv) of part I of this appendix may not have a burn rate greater than 4.0 inches per minute when tested horizontally in accordance with the applicable portions of this appendix.

(2) *Cargo and baggage compartments not occupied by crew or passengers.*

(i) [Reserved]

(ii) A cargo or baggage compartment defined in § 25.857 as Class B or E must have a liner constructed of materials that meet the requirements of paragraph (a)(1)(ii) of part I of this appendix and separated from the airplane structure (except for attachments). In addition, such liners must be subjected to the 45 degree angle test. The flame may not penetrate (pass through) the material during application of the flame or subsequent to its removal. The average flame time after removal of the flame source may not exceed 15 seconds, and the average glow time may not exceed 10 seconds.

(iii) A cargo or baggage compartment defined in § 25.857 as Class B, C, D, or E must have floor panels constructed of materials which meet the requirements of paragraph (a)(1)(ii) of part I of this appendix and which are separated from the airplane structure (except for attachments). Such panels must be subjected to the 45 degree angle test. The flame may not penetrate (pass through) the material during application of the flame or subsequent to its removal. The average flame time after removal of the flame source may not exceed 15 seconds, and the average glow time may not exceed 10 seconds.

(iv) Insulation blankets and covers used to protect cargo must be constructed of materials that meet the requirements of paragraph (a)(1)(ii) of part I of this appendix. Tiedown equipment (including containers, bins, and pallets) used in each cargo and baggage compartment must be constructed of materials that meet the requirements of paragraph (a)(1)(v) of part I of this appendix.

(3) *Electrical system components.* Insulation on electrical wire or cable installed in any