

(c) *Time limited systems.* The applicant must define the system time capability of each ETOPS significant system that is time-limited.

K25.1.4 Propulsion systems.

(a) *Fuel system design.* Fuel necessary to complete an ETOPS flight (including a diversion for the longest time for which the applicant seeks approval) must be available to the operating engines at the pressure and fuel-flow required by §25.955 under any airplane failure condition not shown to be extremely improbable. Types of failures that must be considered include, but are not limited to: crossfeed valve failures, automatic fuel management system failures, and normal electrical power generation failures.

(1) If the engine has been certified for limited operation with negative engine-fuel-pump-inlet pressures, the following requirements apply:

(i) Airplane demonstration-testing must cover worst case cruise and diversion conditions involving:

(A) Fuel grade and temperature.

(B) Thrust or power variations.

(C) Turbulence and negative G.

(D) Fuel system components degraded within their approved maintenance limits.

(ii) Unusable-fuel quantity in the suction feed configuration must be determined in accordance with §25.959.

(2) For two-engine airplanes to be certificated for ETOPS beyond 180 minutes, one fuel boost pump in each main tank and at least one crossfeed valve, or other means for transferring fuel, must be powered by an independent electrical power source other than the three power sources required to comply with section K25.1.3(b) of this appendix. This requirement does not apply if the normal fuel boost pressure, crossfeed valve actuation, or fuel transfer capability is not provided by electrical power.

(3) An alert must be displayed to the flightcrew when the quantity of fuel available to the engines falls below the level required to fly to the destination. The alert must be given when there is enough fuel remaining to safely complete a diversion. This alert must account for abnormal fuel management or transfer between tanks, and possible loss of fuel. This paragraph does not apply to airplanes with a required flight engineer.

(b) *APU design.* If an APU is needed to comply with this appendix, the applicant must demonstrate that:

(1) The reliability of the APU is adequate to meet those requirements; and

(2) If it is necessary that the APU be able to start in flight, it is able to start at any altitude up to the maximum operating altitude of the airplane, or 45,000 feet, whichever is lower, and run for the remainder of any flight.

(c) *Engine oil tank design.* The engine oil tank filler cap must comply with §33.71(c)(4) of this chapter.

K25.1.5 Engine-condition monitoring.

Procedures for engine-condition monitoring must be specified and validated in accordance with Part 33, Appendix A, paragraph A33.3(c) of this chapter.

K25.1.6 Configuration, maintenance, and procedures.

The applicant must list any configuration, operating and maintenance requirements, hardware life limits, MMEL constraints, and ETOPS approval in a CMP document.

K25.1.7 Airplane flight manual.

The airplane flight manual must contain the following information applicable to the ETOPS type design approval:

(a) Special limitations, including any limitation associated with operation of the airplane up to the maximum diversion time being approved.

(b) Required markings or placards.

(c) The airborne equipment required for extended operations and flightcrew operating procedures for this equipment.

(d) The system time capability for the following:

(1) The most limiting fire suppression system for Class C cargo or baggage compartments.

(2) The most limiting ETOPS significant system other than fire suppression systems for Class C cargo or baggage compartments.

(e) This statement: “The type-design reliability and performance of this airplane-engine combination has been evaluated under 14 CFR 25.1535 and found suitable for (identify maximum approved diversion time) extended operations (ETOPS) when the configuration, maintenance, and procedures standard contained in (identify the CMP document) are met. The actual maximum approved diversion time for this airplane may be less based on its most limiting system time capability. This finding does not constitute operational approval to conduct ETOPS.”

K25.2. Two-engine airplanes.

An applicant for ETOPS type design approval of a two-engine airplane must use one of the methods described in section K25.2.1, K25.2.2, or K25.2.3 of this appendix.

K25.2.1 Service experience method.

An applicant for ETOPS type design approval using the service experience method must comply with sections K25.2.1(a) and K25.2.1(b) of this appendix before conducting the assessments specified in sections K25.2.1(c) and K25.2.1(d) of this appendix, and the flight test specified in section K25.2.1(e) of this appendix.

(a) *Service experience.* The world fleet for the airplane-engine combination must accumulate a minimum of 250,000 engine-hours. The FAA may reduce this number of hours if