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FEB 27 1963

In Reply
Refer To: CE-214

Model 65-90T
Project CA76CE-DO

Beech Aircraft Corporation
Wichita 1,
Kansas

Attention: Mr. Chester A. Rembleske
Chief Administrative Engineer

Gentlemen:

Two copies of Special Conditions for the Model 65-90T turbo-propeller powerplant installation are enclosed.

These conditions have been reviewed by our Washington office and they have indicated their concurrence.

Sincerely yours,

ORIGINAL SIGNED BY
F. M. BONDOR

Walter J. O'Toole
Chief, Engineering and
Manufacturing Branch

Enclosure

cc:
FS-140
CE-218 (2)

CAHughes:hea:CE-214:x4396:2/27/63

INITIALS	RTG. SYM.	DATE	INITIALS	RTG. SYM.	DATE
CAH	CE214	2-27-63			

214

Feb. 18, 1963

SPECIAL CONDITIONS FOR BEECH 65-90

In order to maintain the same level of of safety as established by CAR 3 dated May 15, 1956 and Amendments 3-1, 3-2, and 3-6, the following Special Conditions should be applied as additions and in lieu of those not applicable to turbo-propeller powerplant installations.

Item

1. CAR 3.411(c) Turbine powerplant operating characteristics shall be investigated in flight to determine that no adverse characteristics, such as compressor stall, surge or flame out, are present to a hazardous degree during normal and emergency operation of the airplane and of the engine.

2. CAR 3.415(a) Turbine engine installations shall not result in vibration characteristics of the engine exceeding those established in accordance with CAR Part 13.

3. CAR 3.416(d) Propeller installation for turbine powered airplane, including blade pitch control mechanisms, emergency protective features, and other devices intended to coordinate propeller and engine functions, shall be determined to be suitable for the purpose by means of analysis, component testing, flight demonstration, service testing, or a combination of these means.

4. CAR 3.418(a) On multi-engine turbine-powered aircraft, if engine failure or propeller malfunction during normal or emergency operation can result in sufficiently rapid increase in drag to affect airplane control to hazardous degree, then means shall be provided to limit the drag to a safe value.

5. CAR 3.429(a) Fuel system for turbine engine installations shall provide for continuous flow of all fuel to the engine in normal operation without interruption of fuel flow due to depletion of fuel in tanks other than the main tanks.

6. CAR 3.435(a) The fuel flow rate for turbine engine fuel pump systems shall be 125 percent of the fuel flow required to develop the standard sea level atmospheric condition take-off power selected and included as an operating limitation in the Airplane Flight Manual.

   CAR 3.435(b) In the systems where the fuel filter requires a bypass arrangement, the fuel flow rate corresponding with 100 percent of the engine maximum fuel demand at standard atmospheric conditions shall be demonstrated with the fuel filter blocked.

7. CAR 3.441(e) For use in turbine powered airplanes, the fuel tank as mounted in the aircraft shall be designed so as to withstand the greater of the following pressures without failure or leakage:

a. 3.5 p.s.i.
b. 125 percent of the maximum air pressure developed in the tank.
c. The pressure equivalent to the hydrostatic head developed during maximum limit acceleration of the aircraft with a full tank.

8. CAR 3.449(c) Turbine engines which do not possess a pad for directly driving a fuel pump, a reliable and independent power source for each pump shall be provided. It shall be demonstrated that the pump installations provide a reliability and durability equivalent to that intended by CAR 3.449(a) and (b).

9. CAR 3.552(a) For use in turbine engine airplanes, the fuel strainer or filter shall be of adequate capacity, commensurate with operating limitations, to insure proper service and of appropriate mesh to insure proper engine operation with the fuel contaminated to a degree, with respect to particle size and density, which can be reasonably expected to occur in service. The degree of fuel filtering shall be not less than that established for the engine in accordance with Part 13 of the Civil Air Regulations.

CAR 3.552(b) When filters or strainers susceptible to icing are incorporated in the fuel system, a means shall be provided to automatically maintain fuel flow in the event ice particles accumulate or restrict flow by clogging the filter or screen.

10. CAR 3.582(a) For turbine engine aircraft, the compliance with the provisions of Section 3.581 shall be demonstrated by tests under critical surface (ground or water) and flight operating conditions. If the tests are conducted under conditions which deviate from the maximum ambient atmospheric temperature, the recorded power plant temperatures shall be corrected in accordance with Section (b) below. The corrected temperatures determined in this manner shall not exceed the established limits.

(1) A maximum ambient atmospheric temperature of not less than 100°F. at sea level conditions shall be established by the applicant as a limitation on the operation of the airplane.

The temperature lapse rate shall be 3.6 degrees F. per thousand feet of altitude above sea level until a temperature of -69.7 degrees F. is reached, above which altitude the temperature shall be constant at -69.7 degrees F.

(2) Temperatures of all power plant components and engine fluids, for which temperature limits have been established, shall be corrected by adding the difference between the maximum ambient atmospheric temperature and the temperature of the ambient air at the time of the first occurrence of maximum component or fluid temperature recorded during the cooling tests, unless a more rational correction is shown to be applicable.

11. CAR 3.587(c) For turbine powered multi-engine airplanes, compliance with the provisions of Section 3.581 shall be established for the take-off, climb, enroute, and landing stages of flight which corresponds with the applicable performance regulations. The cooling tests shall be conducted with the airplane in the configuration and operated under the conditions which are critical relative to cooling during each stage of flight.

(1) For all stages of flight, temperatures shall be stabilized under conditions from which entry is made into the stage flight for which a test is conducted, except when the entry condition normally is not one during which component and engine fluid temperatures would stabilize. In such case, operation through the full entry condition shall be conducted prior to entry into the stage of flight for which the test is conducted in order to allow temperatures to attain their natural level at the time of entry. In particular, the take-off cooling tests shall be preceded by a period during which the power plant component and engine fluid temperatures are stabilized with the engine at ground idle. A temperature shall be considered stabilized when its rate of change is less than 2 degrees F. per minute.

(2) Cooling tests for each stage of flight shall be conducted until one of the following conditions is fulfilled.

1. Component and engine fluid temperatures stabilize;
2. The stage of flight is completed; or,
3. An operation limitation is reached.

12. CAR 3.605(c) Turbine powered airplanes shall have their engine air inlet ducts located or protected as to minimize the ingestion of foreign matter during take-off, landing, and taxiing.

13. CAR 3.606(f) Turbine powered airplanes shall be capable of operating throughout the flight power range without the accumulation of ice in the air induction system such as to adversely affect engine operation or cause a serious loss of power and/or thrust in the maximum or intermittent maximum icing conditions defined in 4b.1(b) (7) (8).

14. CAR 3.608(a) Turbine powered airplanes shall have a deicing fluid supply supply that is adequate for the type of operation intended for the aircraft.

15. CAR 3.611 (a) The design of the engine air inlet duct for turbine powered airplanes shall be such as to assure that flammable fluids will not leak or be carried into the engine intake in case of failure or malfunctioning of any flammable fluid carrying component on or near the engine. If induction system screens are employed and fluid de-icing is used to de-ice the induction system and screen, it shall be demonstrated that fire hazard will not occur. The use of bleed air containing de-icing fluids for other systems shall not constitute a hazard.

16. CAR 3.615(c) Exhaust system for turbine powered airplanes shall be constructed and arranged in such a manner as to assure the safe disposal of exhaust gases without the existence of a hazard of fire or adverse effects on any of the aircraft components. Turbine engine exhaust systems having low spots or pockets shall incorporate drains at such locations. These drains shall discharge clear of the airplane in normal and ground attitudes to prevent the accumulation of fuel after the failure of an attempted engine start.

17. CAR 3.655(b) (3) For turbine powered airplanes, the following shall be provided in addition to power plant instruments specified in this section.

    (i) Exhaust gas temperature or turbine inlet temperature indicator for each engine.

    (ii) A fuel flowmeter shall be provided if fuel flow is required to be maintained within established limits by the pilot.

    (iii) An indicator to indicate to the pilot the power output of each engine.

    (iv) Position indicating means for each propeller on the turbine engine to indicate to the pilot when the propeller blade angle is below the flight low pitch position. The source or indication shall sense blade position directly.