

CHAPTER 80 CONDUCT A FLIGHT ENGINEER PROFICIENCY CHECK

Section 1 Background

1. WPMS ACTIVITY CODE

- Initial Operating Experience: 1356
- Surveillance: 1632

3. OBJECTIVE. The objective of this task is to determine an applicant's qualification to act as a flight engineer on FAR Part 125 airplanes requiring three crewmembers. Successful completion of this task results in an indication of satisfactory or unsatisfactory performance on FAA Form 8410-1.

5. GENERAL. Some aircraft are type certificated for three flight crewmembers (e.g., B-727, DC-10), and FAR Part 125 operators using such aircraft must employ flight engineers. An existing operator wishing to use a flight engineer crewmember who does not meet the recency of experience requirements will request a proficiency check from the FAA if the operator has no flight engineer check airman. An applicant for a FAR Part 125 certificate will have prospective flight engineers evaluated as part of the Demonstration and Inspection Phase during certification. If the prospective flight engineer does not meet the recency of experience requirements, the proficiency flight check must be conducted.

A. Existing Operators. The Principal Operations Inspector (POI) is responsible for ensuring that flight engineer flight checks are accomplished when they are requested by an operator. The POI may conduct the check or may assign a qualified operations inspector to do so.

B. FAR Part 125 Applicants. The certification project manager is responsible for ensuring that flight engineer flight checks are accomplished when they are required for initial certification. The project manager may conduct the check, if qualified, or have a member of the certification team conduct the check, if qualified. If no one on the team is qualified, the project manager must coordinate with the operations unit manager to have a qualified inspector conduct the test.

7. FLIGHT ENGINEER QUALIFICATIONS. For FAR Part 125 operations a person may serve as a required flight engineer if that person has had, within the preceding six calendar months, at least 50 hours of flight time as a flight engineer on the type of airplane involved.

A. Medical Certificate Requirements. The flight engineer must also hold at least a second class medical certificate issued under FAR Part 67 within the preceding 12 months.

B. Flight Engineer Class Ratings. The flight engineer must have at least one of the following aircraft class ratings on the flight engineer certificate as appropriate:

- (1) Reciprocating engine powered
- (2) Turbopropeller powered
- (3) Turbojet powered

9. USE OF FLIGHT SIMULATORS FOR FLIGHT ENGINEER CHECKS. Flight engineers possessing a commercial pilot certificate with an instrument, category and class rating, or pilots already qualified as second in command and reverting to flight engineer, may complete the entire flight check in an approved airplane simulator.

11. KNOWLEDGE PORTION OF THE FLIGHT ENGINEER FLIGHT CHECK. In addition to the topics covered in paragraph 5D and E of Section 2, the inspector must determine that the applicant is familiar and competent with all essential current information and operating procedures used by the operator. The oral or written test must be designed for the make and model airplane to be used for the test. If a simulator is used, the oral or written test must reflect the make and model airplane the flight engineer will be flying.

13. FLIGHT CHECK JOB AIDS. FAA Form 8410-1, Airman Proficiency/Qualification Check is used to indicate whether performance is satisfactory or unsatisfactory. Figure 80-1, Flight Engineer Flight Check Job Aid, is used to assure that all appropriate areas are covered during the check.

15. EVALUATING FLIGHT ENGINEERS.

A. Unsatisfactory Items. Any item checked unsatisfactory on FAA Form 8410-1 results in a failure of the entire flight check.

B. Evaluation Criteria. In addition to the objective standards provided in Section 2, the inspector bases the decision on the following:

- (1) The flight engineer's timeliness and accuracy in execution of duties.
- (2) The flight engineer's comfort at panel.
- (3) How well the flight engineer coordinated with the other crewmembers.

Section 2 Procedures

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. *Prerequisites.* This task requires knowledge of regulatory requirements in FAR Part 125, FAA policies, and --

- Flight engineer flight check procedures
- Task background
- Qualification as an Aviation Safety Inspector (Operations)

B. *Coordination.* This task requires coordination with the principal operations inspector, the operations unit supervisor, and, possibly, the airworthiness unit.

3. REFERENCES, FORMS, AND JOB AIDS

A. References

- Section 602 of the Federal Aviation Act of 1958
- FAR Part 63
- FAR Part 121, specifically FAR § 121.425
- Advisory Circular 125-1A, Operations of Large Airplanes Subject to FAR Part 125
- Order 8400.10, Air Carrier Inspector's Handbook
- Order 8700.1, General Aviation Operations Inspector's Handbook
- Introduction, FAR Part 61 Related Tasks: Considerations for the Practical Test

B. Forms

- FAA Form 8000-36, WPMS Transmittal Form
- FAA Form 8410-1, Airman Proficiency/Qualification Check

C. Job Aids

- Flight Engineer Check Job Aid, Figure 80-1

5. PROCEDURES

A. *District Office Receives Request for Flight Engineer Check.* Requests for flight engineer checks come from operators who do not have the services of a flight engineer check airman or from applicants for a FAR Part 125 certificate.

B. *Schedule Flight Check.* Based on inspector workload and office requirements, schedule a date, place, and time for the check.

C. Verify Applicant's Identity and Certificates.

(1) Verify the flight engineer's identification (driver's license, employee identification, etc.)

(2) Determine if the person holds a flight engineer certificate appropriate for the airplane used in the check.

(3) Determine if the person holds at least a valid second class medical certificate (FAR § 63.31).

(4) If the flight engineer does not present the appropriate and current certificates, advise the airman that the flight check cannot be administered and make entry into Work Program Management System (WPMS). Advise the company in writing (Figure 80-2)

(5) If the flight engineer does present the appropriate and current certificates, go to step C.

D. *Conduct the Knowledge Portion of the Flight Engineer Check.* The knowledge portion of the check consists of an oral or written test covering the following subjects:

(1) The FAR that apply to flight engineers.

(2) The theory of flight and aerodynamics.

(3) Basic meteorology with respect to engine operations.

(4) Center of gravity computations.

(5) Preflight of the airplane to be used in the check.

(6) Calculation of aircraft performance data.

(7) Airplane equipment.

(8) Airplane systems, including specifications, construction features, flight controls, hydraulic systems, pneumatic systems, electrical systems, anti-icing and de-icing systems, pressurization and air-conditioning systems, vacuum systems, pitot-static systems, instrument systems, and fuel and oil systems.

(9) Engines, including construction features, lubrication, ignition, carburetion and induction, supercharging and fuel control systems, accessories, propellers, and instrumentation.

(10) Airplane loading.

(11) Airplane procedures and engineer operations with respect to limitations.

(12) Normal operating procedures (ground and flight), including, as appropriate, servicing methods and procedures; operation of all airplane systems; operation of all engine systems; aircraft loading and center of gravity computation; cruise control (normal, long range, maximum endurance); power and fuel computation; and meteorology as applicable to engine operation.

(13) Emergency procedures and emergency equipment as appropriate to:

(a) Landing gear, brakes, flaps, speed brakes, and leading edge devices

(b) Pressurization and air-conditioning

(c) Portable fire extinguishers

(d) Fuselage fire and smoke control

(e) Loss of electrical power

(f) Engine fire control

(g) Engine shut-down and restart

(h) Oxygen

(i) Hydraulic system

(j) Fuel system

(14) Mathematical computation of engine operations and fuel consumption

(15) If the flight engineer fails the knowledge portion of the test, determine whether or not to continue with the skill or flight portion of the test.

E. Conduct the Skill Portion of the Flight Engineer Check.

(1) Observe the flight engineer conduct a walk-around inspection.

(a) The inspection must be in accordance with the FAA approved flight manual or the company manual.

(b) The inspection must include the procedures outlined in the flight check job aid (Figure 80-1).

(2) Observe the flight engineer's performance during servicing. The flight engineer must adhere to the safe operating procedures outlined in the company policies and procedures manual and the approved airplane flight manual.

(3) Observe the flight engineer's performance during engine start, power checks, pretakeoff procedures, postlanding procedures, and shutdown procedures. The flight engineer must follow the procedures in the company policies and procedures manual and the approved airplane flight manual.

(4) Observe inflight performance of assigned duties during taxi, runup, takeoff, climb, cruise, descent, approach, and landing. The flight engineer must follow safe operating practices and procedures in the company policies and procedures manual and the approved airplane flight manual.

(5) Observe normal duties and procedures relating to the airplane, airplane engines, propellers (if appropriate), other systems and appliances, including power control, temperature control, engine operations analysis, operation of all systems, fuel management, logbook entries, pressurization, and air conditioning. The flight engineer must follow safe operating practices and procedures in the company policies and procedures manual and the approved airplane flight manual.

(6) Observe the flight engineer performing emergency duties and procedures. The flight engineer must recognize and take appropriate action for malfunctions of the airplane, engines, propellers (if appropriate), systems and appliances, including:

(a) Analysis of abnormal engine operation

(b) Analysis of abnormal operation of all systems and corrective actions

(c) Engine fire control

(d) Fuselage fire control

(e) Smoke control

(f) Loss of power or pressure in each system

(g) Engine overspeed

(h) Fuel Dumping

(i) Landing gear, spoilers, speed brakes, and flap extension and retraction

(j) Engine shut-down and restart

(k) Use of oxygen

F. Evaluate the Flight Engineer's Performance

(1) If the flight engineer failed the check:

(a) Debrief the flight engineer on the reasons for failure.

(b) Complete FAA Form 8410-1 in duplicate indicating reasons for disapproval.

(c) Give one copy of the completed FAA Form 8410-1 to the flight engineer and one copy to the POI for the district office files.

(d) Make the appropriate WPMS entry.

(2) If the flight engineer passed the check:

(a) Debrief the flight engineer, emphasizing good points and indicating areas that were satisfactory but marginal.

(b) Complete FAA Form 8410-1 in duplicate indicating approval.

(c) Give one copy of the completed FAA Form 8410-1 to the flight engineer and one copy to the POI for the district office files.

(d) Using FAA Form 8000-36, make the appropriate WPMS entry.

7. TASK OUTCOMES. Completion of this task results in either:

A. A completed FAA Form 8410-1 indicating approval.

B. A completed FAA Form 8410-1 indicating failure.

9. FUTURE ACTIVITIES.

A. The records of any flight engineer checked will be reviewed as part of future surveillance.

B. The flight engineer may return for subsequent checks.

C. The inspector may initiate an enforcement investigation, as appropriate, if the flight engineer is involved in an accident, incident, or possible violation of regulations.

D. Possible reevaluation under Section 609 of the FA Act of 1958.

FIGURE 80-1 FLIGHT ENGINEER FLIGHT CHECK JOB AID

FLIGHT ENGINEER FLIGHT CHECK JOB AID	
Pilot's Name _____ Company _____	
Date _____ Inspector _____	
The flight engineer check should consist of a demonstration of the following.	
Item:	Completed
Knowledge Test (oral or written)	
The FAR applicable to flight engineers	
Theory of flight and aerodynamics	
Basic meteorology and engine operations	
Center of gravity computations	
Preflight	
Airplane equipment	
Airplane systems, including specifications and construction features of --	
Flight controls	
Hydraulic systems	
Pneumatic systems	
Electrical systems	
Anti-icing and de-icing systems	
Pressurization and air conditioning systems	
Vacuum systems	
Pitot-static systems	
Instrument systems	
Fuel and oil systems	

FIGURE 80-1 FLIGHT ENGINEER FLIGHT CHECK JOB AID

Page Two	
Item:	Completed
Engines, including --	
Construction features	
Lubrication	
Ignition	
Carburetion and induction	
Supercharging	
Fuel control systems	
Accessories	
Propellers (if appropriate)	
Instrumentation	
Airplane Loading	
Limitations, including --	
Airplane procedures	
Engine operations	
Normal operating procedures (ground and flight), including --	
Servicing methods and procedures	
Operation of all airplane systems	
Operation of all engine systems	
Cruise control (normal, long range, maximum endurance)	
Power and fuel computations	

FIGURE 80-1 FLIGHT ENGINEER FLIGHT CHECK JOB AID

Page Three	
Item:	Completed
Emergency procedures and emergency equipment Landing gear, brakes, flaps, speed brakes, and leading edge devices	
Pressurization and air conditioning	
Portable fire extinguishers	
Fuselage fire and smoke control	
Loss of electrical power	
Engine fire control	
Engine shutdown and restart	
Oxygen	
Engine operation/fuel consumption computations	
SKILL TEST (In airplane, simulator, or approved training device)	
Preflight inspection	
Servicing	
Engine start and power checks	
Normal duties and procedures, including --	
Airplane engines	
Propellers (if appropriate)	
Airplane systems	
Appliances	
Power control	
Temperature control	

FIGURE 80-1 FLIGHT ENGINEER FLIGHT CHECK JOB AID

Page Four	
Item:	Completed
Engine operations analysis	
Fuel management	
Pressurization and air conditioning	
Logbook entries	
Crew coordination	
Emergency duties and procedures for --	
Analysis of abnormal engine operation	
Analysis of abnormal operation of all systems and corrective action	
Engine fire control	
Fuselage fire control	
Smoke control	
Loss of power or pressure in each system	
Engine overspeed	
Fuel dumping	
Landing gear, spoilers, speed brakes, and flap extension and retraction	
Engine shut-down and restart	
Use of oxygen	
Crew coordination	
REMARKS:	

FIGURE 80-2 LETTER ADVISING PILOT NOT QUALIFIED FOR FLIGHT ENGINEER CHECK

FAA letterhead

Operator's name and address

Dear _____:

This is to inform you that the flight engineer check scheduled for [date] at [location] was not conducted because Mr./Ms. [name of airman] did not qualify.

- Cite reasons why airman was not qualified
- Suggest how each can be corrected

If you have any questions or you wish to reschedule the check with the same or a different airman, please contact this office at [telephone number].

Signed by: CPM, if initial certification
POI, if an existing operator

