

“You have an engine **FIRE!**”

Emergency Descent

Airplane Flying Handbook, Chapter 17

FAR 61.107

Private Pilot - Airplane ACS

FAR 61.127

Commercial Pilot -Airplane ACS

“You have an engine fire!” said the examiner during your check ride.

You knew this was coming. You've read the Airman Certification Standards (ACS), you know both private and commercial check rides require you to be tested on an emergency descent, but are you prepared to demonstrate this maneuver? The answer depends on your training.

Flight students receive simulated engine failure/forced landing training far more often than they do emergency descents. This imbalance fosters some problems on check rides. In evaluating an applicant's performance of an emergency descent, the FAA seeks assurance that the pilot recognizes when to initiate the maneuver - and knows how to perform it safely.

The first item in the ACS under "Emergency Operations," asks you to demonstrate knowledge of the elements related to an emergency descent. In other words, what actions comprise the maneuver, and what things would cause you to perform an emergency descent. The Airplane Flying Handbook (FAA-H-8083-3B) lists some reasons to initiate an emergency descent, such as "an uncontrollable fire, a sudden loss of cabin pressure, or any other situation demanding an immediate and rapid descent."

Some examiners accept these official causes without elaboration. Others create scenarios to elicit your emergency descent decision. Whichever occurs, you should know the recommended configuration, if the manufacturer advises its customers in this maneuver. Not all airplane manuals include emergency descent procedures.

In the absence of manufacturer recommendations, flight schools may create their own emergency descent checklists. The occasional operator dismisses the need for practicing emergency descents, but Federal Aviation Regulation 61.107/61.127, "Flight Proficiency," requires applicants to receive and log training on it.

If you have no checklist to guide you, look in the Airplane Flying Handbook (FAA-H-8083-3B), which offers some secrets to successful emergency descents (and other maneuvers). This handbook is particularly valuable because examiners use the sequence of events it describes to judge emergency descent maneuvers.

Some applicants argue that the omission of emergency descent procedures from the checklist or handbook constitutes a manufacturer's prohibition against the maneuver. Few examiners accept this argument because airplanes used in a flight test must be able to perform all maneuvers specified in the ACS for the certificate or rating sought. Airplanes incapable of performing an emergency descent are unlikely to meet the FAR certification requirements.

Emergency descent procedures exist because some emergencies demand that pilots exercise the fastest practical rate of descent. The key term is "practical rate of descent." One could simply point the nose earthward and play the throttle until the aircraft reaches its never-exceed

speed. However, an examiner who sees this on a check ride may use the short descent time to reach for his Notice of Disapproval packet.

The emergency descent's true objective is to descend as soon and as rapidly as possible (within the aircraft's limitations) to an altitude where you don't need pressurization or supplemental oxygen, or to a position from which you could make a safe landing. This brings up a common mistake students make that is a recurring source of annoyance for examiners. ***Applicants often wrongly think "simulated engine failure" when the examiner calls for an emergency descent.***

The confusion is partly because of the ACS task terminology. Task A is the Emergency Descent. Task B is Emergency Approach and Landing. The two are separate, requiring separate procedures, but applicants suffering from check ride anxiety may hear "Emergency" and grasp the most familiar maneuver - Emergency Approach and Landing. To counter this, your examiner may take pains to ensure that you understand the true request - Emergency Descent.

Task A's third item requires you to attain your aircraft's recommended emergency descent configuration and airspeed, and maintain that airspeed, plus or minus five knots. Typically, a pilot who is not proficient in performing emergency descents will delay pushing the nose down until he has reduced airspeed. Examiners consider it unproductive to slow either to approach or to stall speed before surrendering altitude. It wastes precious seconds.

Once the nose drops below the horizon and you begin to go down, the airspeed needle races up, and you can easily overshoot the target descent airspeed. Airplane Flying Handbook (FAA-H-8083-3B) wisely mentions that in no case should you fly beyond the never-exceed speed (VNE), the maximum gear-extended speed (VLE), or the maximum flap-extended speed (VFE). If neither the manufacturer nor operator provides one, the lowest of these speeds normally determines your emergency descent speed.

Whichever speed governs the descent, you must begin the maneuver high enough to permit recovery at a safe altitude. Rarely do examiners say "let's go to an appropriate altitude and conduct an emergency descent." For efficiency, most incorporate this maneuver into air work.

The Airplane Flying Handbook (FAA-H-8083-3B) discusses turning during the emergency descent. Executing clearing turns before starting the maneuver makes examiners feel good about your pilot judgment. Airplane Flying Handbook (FAA-H-8083-3B) encourages you to maintain positive load factors during the descent, and continue clearing the area below, by establishing a 30- to 40-degree bank for at least 90 degrees of heading change while initiating the descent. This also increases the rate of descent. Turning during an emergency descent shows your orientation, sharp division of attention, and good planning ability. ACS item S4 agrees with this natural demand.

As the maneuver unfolds, your use of, and adherence to, the appropriate emergency checklist remains a priority according to item S5. Dividing attention may include your handling distractions during the maneuver.

On ACS under "Applicant's use of Checklists," the FAA acknowledges that circumstances may dictate when and how you use your checklist. Single-pilot operation in a single-engine airplane often allows a pilot to begin with a memorized "flow pattern," followed by a checklist review once the pilot fulfills the flow pattern's elements. Your examiner cannot participate by assisting in your maneuver, although an examiner who is alert for traffic might realistically mimic a passenger's contribution to the flight. (A panicking passenger is possible, but few examiners test distraction to that degree.)

One concern is shock-cooling the engine's cylinders during practice emergency descents. Such worry is valid, and Airplane Flying Handbook addresses it. "As soon as all prescribed procedures are completed and the descent is established and stabilized, the maneuver should be terminated."

Instructors and examiners alike need to remember this - The examiner's primary interest is meeting the ACS elements of this maneuver, but we also should remember to take care of the equipment. Safe and smooth handling of the aircraft within its structural limitations satisfies this goal.

Airplane Flying Handbook, Chapter 17

Extracted sample from Private Pilot ACS

IX. Emergency Operations

Task	A. Emergency Descent
References	FAA-H-3083-2, FAA-H-3083-3; POH/AFM
Objective	To determine that the applicant exhibits satisfactory knowledge, risk management, and skills associated with an emergency descent <i>Note: See Appendix 6, Safety of Flight.</i>
Knowledge	The applicant demonstrates understanding of:
PA.IX.A K1	Situations that require an emergency descent (e.g., depressurization, smoke, and/or engine fire).
PA.IX.A K2	Immediate action items and emergency procedures.
PA.IX.A K3	Airspeed, to include airspeed limitations.
Risk Management	The applicant demonstrates the ability to identify, assess and mitigate risks, encompassing:
PA.IX.A R1	Failure to consider altitude, wind, terrain, obstructions, and available glide distance.
PA.IX.A R2	Collision hazards, to include aircraft, terrain, obstacles, and wires.
PA.IX.A R3	Improper aircraft configuration.
PA.IX.A R4	Distractions, loss of situational awareness, and/or improper task management.
Skills	The applicant demonstrates the ability to:
PA.IX.A S1	Clear the area.
PA.IX.A S2	Establish and maintain the appropriate airspeed and configuration appropriate to the scenario specified by the evaluator and as covered in POH/AFM for the emergency descent.
PA.IX.A S3	Demonstrate orientation, division of attention and proper planning.
PA.IX.A S4	Use bank angle between 30° and 45° to maintain positive load factors during the descent.
PA.IX.A S5	Complete the appropriate checklist.