



**U.S. Department
of Transportation
Federal Aviation
Administration**

InFO

Information for Operators

InFO 18014
DATE: 11/19/18

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info

An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

Subject: Compliance with Title 14 of the Code of Federal Regulations (14 CFR) Part 97 Instrument Flight Rules (IFR) Departure Procedure & Missed Approach Climb Gradient Requirements.

Purpose: This InFO provides guidance to pilots and operators of 14 CFR part 25 certificated turbine-powered airplanes. The guidance is intended to assist pilots and operators in determining compliance with the all-engines-operating (AEO) climb gradient requirements published on Standard Instrument Departures (SID), Obstacle Departure Procedures (ODP), Diverse Vector Areas (DVA), and missed approach procedures.

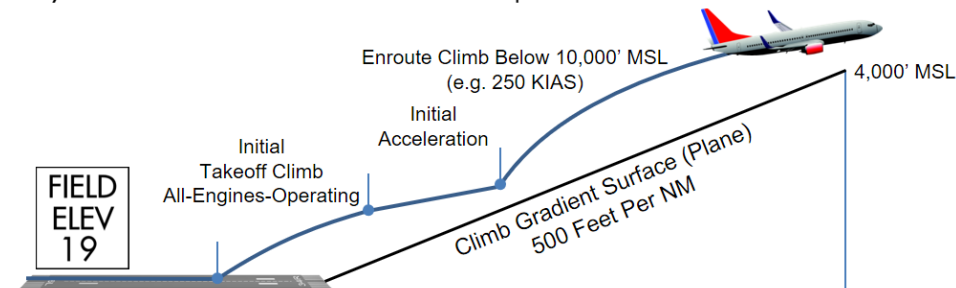
Background: It has come to the attention of the Federal Aviation Administration (FAA) that some confusion exists in regards to compliance with climb gradients on IFR departure procedures and/or missed approach procedures. In some instances, this confusion has led to the application of excessive weight penalties to the departure performance capabilities of the aircraft. More importantly, some operators may not be accounting for all obstacles in the planned departure path when accomplishing the flight planning required to comply with IFR departure procedures and/or missed approach procedures.

Discussion: The United States Standard for Terminal Instrument Procedures (TERPS) establishes the procedure design requirements for instrument departure procedures and missed approach procedures, including any minimum requirements for climb performance applicable to these procedures. When required for obstacle clearance, IFR departure procedures or a DVA may include a higher-than-standard climb gradient originating at the departure end of the runway, above which obstacle protection is provided when flying the procedure. An exception exists for "low, close-in obstacles" near the departure end of the runway. These obstacles are not included in the published departure climb gradient, but are identified in the IFR Takeoff Minimums, Departure Procedures, and Diverse Vector Area (Radar Vectors) - "Takeoff Obstacle Notes" section of the applicable Terminal Procedures Publication. These "low, close-in obstacles" must be cleared by a means other than compliance with the published climb gradient. Likewise, a higher-than-standard missed approach climb gradient may be published from the missed approach point in order to furnish the required clearance of obstacles and/or lower landing minimums for an instrument approach.

A climb gradient published on these procedures is a sloping surface (plane) that originates at the departure end of the runway. All airplanes, per part 97, must remain above this surface until reaching the stated height on the procedure. It is not a climb gradient that must be exceeded at all points during the climb

(see figure below for illustration). The TERPS criteria, and all instrument flight procedures, assume the airplane is operating normally with all engines and systems fully functioning.

Rwy 9: Standard with minimum climb of 500' per NM to 4000.



Pilots are expected to use the climb gradient published (ft/NM) on a SID, ODP, DVA, or a missed approach procedure, in conjunction with the anticipated ground speed during the climb to determine a corresponding rate of climb (ft/min). That average climb rate, at the calculated ground speed, must be maintained in compliance with parts 91 and 97, from the beginning of the climb gradient until reaching the climb gradient termination altitude. The US Terminal Procedure Publication and commercial charting vendors furnish rate-of-climb tables that relate specific climb gradients and typical ground speeds. As prescribed by parts 91 and 97, pilots must not accept a clearance that includes an IFR departure or an instrument approach unless the airplane can remain above the plane generated by the climb gradient.

Manufacturers of turbine-powered, transport-category airplanes, type-certificated under part 25, may not have provided AEO climb performance data that show the ability to comply with TERPS climb gradient criteria. The certification rules do not require such data be provided to operators but may be available from the manufacturer. However, operators or type certificate holders may use sources other than the FAA-approved Airplane Flight Manual (AFM) (e.g., manufacturer-furnished supplemental data, computer software providing AEO climb flight path data, etc.) to adequately determine AEO performance.

Data from these sources above, which is not subject to FAA approval, may be useful in evaluating the ability of the airplane to meet or exceed a climb gradient published on a SID, ODP, DVA, or missed approach procedure. If AEO climb performance data is not provided by the manufacturer or otherwise furnished by the operator, pilots and operators must exercise sufficient care in determining expected takeoff/departure performance (ref. 14 CFR §91.13(a)). On every departure, pilots are expected to manage climb thrust and speed to acceleration height, and to the climb gradient termination altitude, so that the airplane remains above the plane generated by the climb gradient.

The operating rules in § 91.605 and in Subpart I of part 121 and part 135 specify additional performance requirements separate from IFR departure procedure requirements. The criteria upon which these two performance requirements (one-engine-inoperative (OEI) operating rules vs. TERPS) are based differ to the extent that they should be assessed independently of each other. The performance data furnished in the FAA-approved AFM for a part 25 transport category airplane is used for determining compliance with these operating rules. Ensuring compliance with a SID, ODP, or DVA climb gradient under OEI conditions does not adequately ensure compliance with the applicable OEI takeoff obstacle clearance operating rules. Further, a takeoff weight that complies with the operating rule for obstacle clearance during OEI takeoff does not ensure compliance with a climb gradient published on a SID, ODP, or DVA. The FAA imposes no requirement, nor is it recommending, that operators use this FAA-approved

AFM OEI performance data, or that pilots be trained in this practice for the purpose of demonstrating compliance with a climb gradient published on a SID, ODP, DVA, or missed approach procedure.

Recommended Action: Pilots assigned a SID or taking off under IFR using an ODP or DVA that have a climb gradient must, per part 91 and 97, determine that the aircraft can comply with the climb gradient. Pilots may use manufacturer or operator prepared AEO data to determine compliance, or they may determine the rate of climb required by the climb gradient for the anticipated ground speed during the climb. Pilots must ensure that they perform the climb-out, including managing configuration, airspeed, and thrust changes such that the airplane remains above the plane generated by the climb gradient beginning from the departure end of runway. While the airplane's takeoff weight may comply with the operating rules for OEI takeoff obstacle clearance prescribed by part 121 and part 135, this weight does not necessarily guarantee that the airplane can meet the climb requirements on an instrument procedure.

The various operating rules (91, 91K, 125, 121, and 135) have different requirements on aircraft departure and approach performance. The FAA has produced four training videos illustrating proper application of aircraft departure and approach performance requirements as they relate to current policy, rules, and other relevant performance topics. The videos should be reviewed for content and may be incorporated into ground training curricula for pilots, dispatchers, and flight planners of transport category airplanes. They may be viewed and/or downloaded at:

https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/afx/afs/afs400/afs410/obstacle/

Additional information on IFR departure procedure and missed approach climb gradients can be found in the latest edition of the Instrument Procedures Handbook (FAA-H-8083-16B).

Contact: Questions or comments regarding this InFO should be directed to the Flight Operations Group, at 202-267-9009.