



PERFORMANCE PLANNING

Climb Gradient (*Minimum*) Standard

VFR 1.6

IFR 3.3

Ground Speed x Gradient = FPM

FPM ÷ Ground Speed = Gradient

Feet Per NM ÷ 60 = Gradient

- Use longer of Dry / Wet Runway Length
- Use Actual Conditions for V₁ V_r V₂
- May Use Headwind Credit for Takeoff
- No Headwind Credit for Landing
- No Thrust Reverser Credit for Landing
- AFM Pages 4-366 thru 4-389 Landing Distance Advisory Information
- Fuel Loading Table: Ops Manual 7-9 Advisory Section
- For Second Segment and Enroute or Turning Climb, Up to and Including a 15° Bank Angle, Reduce the Net Climb Gradient by 1.2% (AFM Page 4-37 (10))

Weight Limited by Approach Climb Requirements

The takeoff weight must be limited so that, considering fuel consumed, the aircraft can climb at a minimum gradient of 2.1% (gross) in the event of a missed approach at each of the following –

NOTE: The 2.1% gradient is for two-engine airplanes.

- (a) The destination airport
- (b) The alternate airport (if designated, including a takeoff alternate or planned diversionary airport)

The approach climb gradient is determined with one engine inoperative and the aircraft in the approach configuration.

Weight Limited by Landing Climb Requirements

The takeoff weight must be limited so that, considering fuel consumed, the aircraft can climb at a minimum gradient of 3.2% (gross) in the event of a go-around at:

- Destination Airport
- Alternate Airport

The landing climb gradient is determined with all engines operating and the aircraft in the landing configuration.

On FAR 135 flights, the 15% additional runway required for landing on a "wet or slippery" runway, and the 15% addition when visibility / RVR is less than 3/4 SM or 4000 RVR, *are not* cumulative.

Definitions 4-8 AFM

Level Off Altitude

The barometric altitude at which a second segment climb ends.

1500' AGL Net Climb Gradient @ V_2 adjusted to Gross Climb Gradient

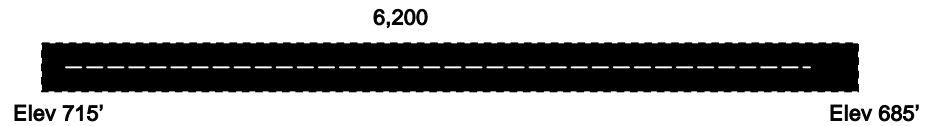
Flightcrews **shall** use the **standard temperature lapse** rate of minus 2° per thousand feet.

When present, headwind component may be used in performance computations. When present, a tailwind component **shall** always be considered in any performance computation.

Interpolation of Performance Data: Unless prohibited by the appropriate AFM or the aircraft's Standard Operating Procedures, it is permissible to interpolate between values of temperature, elevation, or aircraft gross weight on tabular data charts. However, interpolation **shall** be limited to two parameters; i.e. if interpolating between temperature and elevation, then actual gross weight may not be interpolated.

Calculating Runway Slope

- Find the difference in elevation figures from both ends of the runway.
(Elevation of highest end of runway minus the elevation of the lowest end of the runway)
- Divide that value by the runway length.
- Multiply by 100



Example: $715 - 685 = 30$
 $30 \div 6,200 = 0.004838 \times 100 = 0.48\%$ Slope

Calculating Required Runway / Landing Distance – FAR 91K / 135

Required landing distance must be within 60% or 80% of required runway length IAW flight manual.

- Calculate required landing distance IAW AFM for conditions
(temp/weight/elevation/winds/aircraft configuration/runway condition)
- Multiply available runway landing length by either .60 or .80 = Adjusted Runway Length
- Calculated landing distance must be equal to or less than adjusted runway length

Example: Required IAW AFM = 2,840'
 Available Runway Length = 6,200'
 Adjusted Runway Length = 3,720'
 (6200 x .60)

Result: Required Landing Distance is within Adjusted Runway Length

* **Note** On FAR 135 flights - 15% additional runway required for landing on a "wet or slippery" runway.

On FAR 135 Flights - 15% additional runway When visibility / RVR is less than 3/4 SM or 4000 RVR

WEIGHT = 16500 POUNDS					
		VREF = 111 KIAS		VAPP = 117 KIAS	
TEMP DEG C	TAILWIND	ZERO	HEADWINDS		
	10 KTS	WIND	10 KTS	20 KTS	30 KTS
-25	3150	2620	2470	2320	2180
-20	3180	2650	2510	2360	2210
-15	3220	2690	2540	2390	2240
-10	3260	2730	2570	2420	2280
-5	3290	2760	2610	2460	2310
0	3330	2800	2650	2490	2340
5	3370	2840	2680	2530	2380
10	3410	2870	2720	2560	2410
15	3450	2910	2750	2600	2450
20	3490	2950	2790	2630	2480
25	3530	2990	2830	2670	2520
30	3570	3020	2860	2700	2550
35	3610	3060	2900	2740	2590
40	3650	3090	2930	2770	2620
45	3690	3130	2970	2810	2650
50	3720	3170	3000	2840	2690
54	3750	3190	3030	2870	2710

Wet Runway

Adjusted Runway Length $3,720' \times .15 = 558$
 $3,720 + 558 = 4,278' =$ Adjusted Runway Required

Result: Adjusted Runway Required (4,278') is within Actual Available Runway (6,200')

