

LANDING DISTANCE COMPUTATION



Landing Performance Assessment (LPA) – As part of the approach briefing, discuss landing performance. If weather, runway surface condition, aircraft status, or any other relevant factor has degraded since release planning, or if operating under part 135 and visibility is less than $\frac{3}{4}$ sm or 4000 RVR, re-calculate landing distance using AFM data. FOM 2.13.20. Page 2-91

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 $\frac{3}{4}$ SM 4000 feet, are not cumulative.

Recalculating Landing Distance – When accomplishing a new LPA

1. Select the most suitable landing runway. If braking action is reported nil by a similar-sized aircraft within approximately 10 minutes prior to landing, do not land on that runway.
2. Determine the required landing distance for the runway conditions (dry or wet/contaminated).
3. Add 15% to the above landing distance. Total distance must not exceed available runway landing distance.
4. Apply runway contamination information as follows:
 - a. Use type and depth of runway contamination reported by ATC or ATIS. If the depth is estimated, use the worst case AFM data for that type of contamination.
 - b. If not available from ATC or ATIS, request contamination information from the airport manager, FBO staff, or individual providing Unicom service. Use the worst case AFM data for that type of contamination.

FAR 135.385 (d)

... "would allow a full stop landing at the intended destination airport within 60 percent of the effective length ...

Planned Landing Distance (FOM 2.4.7 Page 2-24)

The AFM dry landing distance based on the following:

- Gross weight
- Elevation
- Temperature
- Engine anti-ice
- Aircraft configuration

Factored Landing Distance (FOM 2.4.7 Page 2-24)

The AFM dry landing distance adjusted by FAR required flight planning additives.

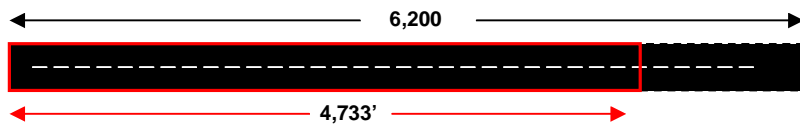
Calculating Required Runway / Landing Distance – FAR 91K / 135

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)
- Divide available runway landing length by either .60 or .80 = Adjusted Runway Length
- Adjusted landing distance must be equal to or less than available runway length

Example: Required Landing Distance IAW AFM = 2,840'
Available Runway Length = 6,200'
Adjusted Runway Length = 4,733'
(2840 ÷ 0.6)

Result: Required Landing Distance is within Adjusted Runway Length



***Note - Runway Available for Takeoff Reduced by 50 Feet for Line Up** – Available runway length is reduced by 50 ft, to account for the distance to properly align the aircraft with the runway centerline. (FOM 2.4.7 Page 2-27)

***Note - Interpolation of Performance Data** – Unless prohibited by the AFM or other procedure, interpolate up to two factors per set of takeoff tabular data (i.e., if interpolating temperature and elevation, do not also interpolate weight).

Exception: Do not interpolate wind data.

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	2760	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	3760	3190	3030	2870	2710

FOM 2.4.7

If the surface of the planned landing runway is forecast or expected to be wet, the landing distance computed in accordance with the reduced planning requirement shall be increased by 15% minimum.

Wet Runway (FOM 2.4.7 Page 2-25)

A runway is considered wet when its surface is reflective. A surface that appears darkened by residual moisture (damp) is not considered as wet.

Note: Two landing distance computations are required to release a flight under the reduced landing distance planning requirement if the planned landing runway is forecast or expected to be "wet" (FOM 2.4.7)

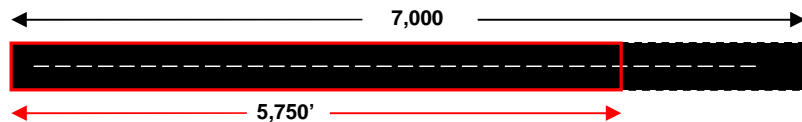
On FAR 135 flights - 15% additional runway required for landing on a "wet or slippery" runway.

On FAR 135 Flights - 15% additional runway when visibility / RVR is less than ¾ SM or 4000 RVR

AFM Planned Landing Distance 3,000
 Factored Landing Distance (Non-DAAP) 5,000'
 [3000 ÷ 0.6]
 Multiply Factored Landing Distance by 1.15 (15%)

Result: Adjusted Runway Required (5,750')

Adjusted Runway Required is within Actual Available Runway (7,000')



Adjusting For Wet Runway (FAR 91K & 135 Flights)

Step	Action	Example – Non-DAAP	Example – DAAP
		(Available runway length: 7000 ft)	
1	a. Obtain planned landing distance. b. Divide planned landing distance by 0.6 (0.8 if using DAAP) to obtain factored landing distance. c. Multiply factored landing distance by 1.15.	a. Planned landing distance: 3000 ft b. Factored landing distance: 3000 ÷ 0.6 = 5000 c. 5000 x 1.15 = 5750	a. Planned landing distance: 3000 ft b. Factored landing distance: 3000 ÷ 0.8 = 3750 c. 3750 x 1.15 = 4312.5
2	Obtain AFM wet landing distance.	AFM wet landing distance: 5600 ft	AFM wet landing distance: 5600 ft
3	Use the greater result of steps 1 and 2 and verify that it is less than, or equal to, the available runway length.	5750 ft is less than 7000 ft; therefore, the runway meets the requirement for dispatch.	5600 ft is less than 7000 ft; therefore, the runway meets the requirement for dispatch.

Contaminated Runway (FOM 2.4.7. Page 2-24)

A runway is contaminated when more than 25% of the required runway length, within the width being used, is covered by:

- Standing water or slush deeper than 1/8 in., or
- Accumulation of snow or ice.

If the section of the runway surface that is covered with standing water or slush is located where rotation and liftoff will occur, or during the high speed part of the takeoff roll, the retardation effect will be far more significant than if it were encountered early in the takeoff while at low speed. In this situation, the runway might better be considered contaminated rather than wet.

Adjusting For Contaminated (FAR 91K &135 Flights)

Step	Action	Example (Available runway length: 7000 ft)
1	a. Obtain planned landing distance. b. Divide planned landing distance by 0.6 to obtain factored landing distance. c. Multiply factored landing distance by 1.15.	a. Planned landing distance: 3000 ft b. Factored landing distance: $3000 \div 0.6 = 5000$ c. $5000 \times 1.15 = 5750$
2	Obtain AFM FAA-approved landing performance data, or AFM advisory data, for the actual type of contaminant to determine the landing distance.	AFM contaminated landing distance: 6500 ft
3	Use the greater result of steps 1 and 2 and verify that it is less than, or equal to, the available runway length.	6500 ft is less than 7000 ft; therefore, the runway meets the requirement for dispatch.

LANDING DISTANCE COMPUTATION

FOM 2.4.7 b.

(1) 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 statute mile/4000 feet, are not cumulative.

FOM 2.4.7 i.

FAR 135 Flight: In accordance with FAR 135.385 (d) the landing distance that meets the 60% of effective runway length required by 135.385 (d), or the landing distance that meets the 80% effective runway length allowed by 135.385 (f) (i.e., when flight meets requirements for use of DAAP provisions in FOM 2.4.9), **shall** be increased by a minimum of 15% for landing on a wet runway. This corrected landing distance is used to determine compliance with operating weight limits in FOM 2.4.8.

FAR 135.385 (d)

. . . "would allow a full stop landing at the intended destination airport within 60 percent of the effective length . . .

FOM 2.4.9 b. **Actual Landing Distance**

The "unfactored" certified landing distance" for a given weight / temperature / altitude, that is corrected for the applicable factors of; reported meteorological and runway surface conditions; runway slope; airplane configuration; approach speed, and; other factors required by the applicable AFM for normal operations.

Factored Landing Distance

The "unfactored certified landing distance" increased by the preflight planning safety margin (i.e., 60% or 80%) and other factors required by the applicable operating rules (i.e., "135" of "91K")

FOM 2.4.9 e. 9.

If the surface of the planned landing runway is forecast or expected to be wet, the landing distance computed in accordance with the reduced planning requirement **shall** be increased by 15% minimum.

~ Note ~

Two landing distance computations are required to release a flight under the reduced landing distance planning requirement if the planned landing runway is forecast or expected to be "wet" (per definition in FOM 2.4.7)

- (1) Determine the 80% "Factored Landing Distance" and increase by 15%.
- (2) Then determine the "Actual Landing Distance" from the AFM (approved or advisory data, as appropriate) for a "wet" runway.
- (3) Compare the two "planned" landing distances from (1) and (2); the longer of the distances **shall** be used to determine the planned maximum allowable takeoff weight for release of the flight.

EXAMPLE:

Available Runway
6,200'

• **Factored Landing Distance** ($2840 \div 0.6 = 4733$) * 2840' is based on AFM Dry Runway
4,733
 $4733 \times 1.15 = 5,489'$

• **Actual Landing Distance** 4,525'
(Based on AFM for "Wet" Runway)

Longer of the two:

- Factored **5,489''**
- Actual 4,525''

This distance is within the available runway of 6,200' IAW FAR 135.385 and FOM 2.4.7

Calculating Wet Landing Distance

Dry Landing Value:

16,000 lbs weight

Sea Level

+5 Degrees C

Zero Wind

Flaps 35

Landing Runway Length Required: 2,840'

Figure 4-43 Sheet 1 of 30

Corrected Value:

Flaps 35°

0.125" Standing Water

2900' Dry = 4,525' Corrected Landing Runway Length

Section VII