



WESTERN REGION TECHNICAL ATTACHMENT
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IMPACT OF WEATHER ON AVIATION #4

Takeoff/Approach Minimums

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Because the NWS measures ceiling and visibility in observations and uses both in forecasts and briefings, there is a tendency to think they are equally important to pilots. However, pilots are more likely to think in terms of takeoff and approach minimums, decision heights, and minimum descent altitudes.

The standard IFR takeoff minimum for aircraft with two engines or less is one statute mile visibility; for aircraft with more than two engines, the standard minimum is one-half mile visibility. No ceiling criteria apply. Many airports have other takeoff minimums. For example, at Cedar City, Utah, aircraft using Runway 8 must have a ceiling no less than 3,500 feet and at least 3 statute miles visibility or use the standard takeoff minimum with a minimum climb gradient of 450 feet per nautical mile to 10,000 feet.

Approach minimums are even more complicated. For the airports we forecast for, and are most likely to brief to, there usually is more than one set of landing minimums. Minimums vary according to runway used, type of aircraft, pilot ratings, and type of approach.

For specially certified aircraft with certified aircrews on certain runways, extremely low landing minimums may apply. At this time, the lowest approach minimums in the Western Region are at Los Angeles International, with an RVR of 700 feet, and San Francisco International, with an RVR of 600 feet. There is an established category which contains no RVR limit at all, but no certifications exist to use this category in the West.

At the other extreme, all published instrument landing minimums for South Lake Tahoe require at least 5 miles visibility, and the pilot must be able to see the runway complex (lights, markers, centerline, etc.) anywhere from 6960 feet to 8,800 feet ASL, depending on the type of approach.

Since it is nearly always more important to get aircraft landed than it is to permit aircraft to depart, we tend to concentrate more on approach minimums than takeoff minimums. In fact, the only reason takeoff minimums were established was to ensure that if serious mechanical difficulties should develop during a departure, the aircraft would be able to return to the departure airport or a nearby airport. For NWS concerns, it usually is sufficient to be aware of the lowest approach minimums or most commonly used approach minimums for the airfield.

Decision height (for straight-in precision approaches) and minimum descent altitude (for nonprecision approaches, including all circling approaches) are fixed altitudes. The pilot is not permitted to descend below these altitudes unless he/she is able to find specific visual references (like runway lights or markers) to use for landing. The standard decision height is 200 feet above the runway, though many exceptions apply. Minimum descent altitude is always higher than the decision height for a given runway, since the pilot is not able to determine his position as accurately using a nonprecision approach.

So where do ceilings fit in? Part 121 operators (air carrier flights capable of carrying more than 30 passengers, plus some other flights) must consider ceiling forecasts and observations in flight planning. When terminal forecasts contain the possibility of ceilings dropping to or below certain heights, the aircraft must declare alternate airports in the flight plan. This, in turn, means the aircraft must carry more fuel.

In some cases, a forecast ceiling at or below certain heights--even in the variability terms--may mean that the airport must be eliminated from the flight plan. Ceilings dropping to 500 feet are universally important; other ceiling heights also may be important in flight planning. Aviation forecasters are expected to be aware of the critical ceiling heights in their forecast area, so that in low-confidence decisions they do not arbitrarily choose a ceiling height which precludes an air carrier from at least considering a terminal.

A ceiling report also clues the pilot about the likelihood that the necessary lights/markings will be visible from the decision height or minimum descent altitude on approach.