Federal Aviation Agency

ADVISORY CIRCULAR

AC NO: AC 90-6	AIR TRAFFIC CONTROL AND GENERAL OPERATIONS
EFFECTIVE:	7/16/63

SUBJECT: RUNWAY VISUAL RANGE

Cancelled by AC 00-13 dated 7/16/63

1. **PURPOSE.** This circular is issued to advise airspace users of the application of Runway Visual Range reports in determining landing and take-off minimums which may apply to their operations.

2. **BACKGROUND.** It has become apparent that the purpose and use of Runway Visual Range is not clearly understood by all users. This circular has been prepared to provide explanatory information on Runway Visual Range and Runway Visibility. Where minimums are discussed, it should be understood that they apply only to those classes of users for which a requirement has been established in the regulations.

3. **DEFINITIONS.**
   a. Prevailing visibility is the horizontal distance at which targets of known distance are visible over at least half of the horizon. It is determined by an observer viewing selected dark objects against the horizon sky during the day and moderate-intensity unfocused lights at night.
   b. Runway visibility is the meteorological visibility along an identified runway. It can be measured by instrument or human observer. Where a transmissometer is used for measurement, the sighting of dark objects against the horizon sky during daylight and the sighting of moderately intense unfocused lights of the order 25 candlepower at night.
   c. In the United States, runway visual range is an instrumentally-derived value, based on standard calibrations, that represents the horizontal distance a pilot will see down the runway from the approach end; it is based on the sighting of either high-intensity runway lights or on the visual contrast of other targets, whichever yields the greatest visual range.

   NOTE: That runway visibility is defined in terms of the distance at which an observer can see a moderate-intensity light source (25 candlepower). Runway visual range is defined in terms of the distance high-intensity runway lights can be seen. It is evident that the brighter the light, the farther it can be seen. It is clear then that the high-intensity runway lights, which have peak intensities measured in thousands of candlepower can be seen at a much greater distance than a standard 25 candlepower light. This is the primary advantage of RVR.

4. **TRANSMISSOMETER.** The primary instrument used to determine RVR and RVV is the transmissometer. It consists of a projector, a detector, and a meter or instrument to indicate the transmission of light through the atmosphere. The projector directs a steady light beam of constant intensity toward a receiver a known distance away. The receiver is a photoelectric detector which is sensitive to the varying intensity of the projected light beam. The intensity of the light received at the detector is dependent on the degree to which the path between the projector and detector is obstructed by rain, snow, fog, haze, smoke, dust, etc. The projector and detector are spaced 500 feet apart (750 feet in the earlier installations) and are adjacent to the touchdown area of the runway.

5. STATUS OF RVR INSTALLATION PROGRAM (4-28-63).

Total transmissometers installed	117
RVR dial indicator	29
RVR digital indicator systems	14
RVR total systems installed	43
ILS systems installed	231
Approach Light Systems (Type A)	179

The U.S. Weather Bureau has 142 additional transmissometers on order with delivery expected at the rate of 20 units per month. The present plan is that RVR equipment will be installed on each runway equipped with an instrument landing system and on takeoff runways without ILS where deemed necessary. All presently installed Runway Visibility Systems will be converted to Runway Visual Range Systems as fast as equipment is available.

6. LANDING AIDS—RVR. The following landing aids will be required for approval of RVR for landing without respect to the reported ceiling:

a. High-intensity runway lights spaced not more than 200 feet apart along the runway.
b. Full configuration A approach lights with condenser discharge flashers.
c. Complete ILS or PAR.
d. Transmissometer and associated control tower display equipment calibrated in feet.
e. All-weather runway markings or runway centerline lighting.
f. Compass locator at the outer marker.

7. TAKE-OFF AIDS—RVR. The following aids will be required for approval of RVR for takeoff without respect to reported ceiling:

a. High-intensity runway lights spaced not more than 200 feet along the runway.
b. Transmissometer and associated control tower display equipment calibrated in feet.
c. All-weather runway markings or runway centerline lighting.

8. RVR MINIMUMS.

a. RVR minimums are published in Part 97 of the Federal Aviation Regulations and the Federal Register, and are depicted on Coast and Geodetic AL charts. Additional minimums for air carriers are contained in the Air Carrier Operations Specifications. Landing minimums of RVR 2600 are normally approved for those runways that have the required landing aids installed and operating, and have meteorological landing minimums of 200½. At those locations that have all of the required aids and, in addition, have high-intensity runway lights spaced along the runway at 100′ intervals or touchdown zone lighting and runway centerline lighting, landing minimums of RVR 2000 may be approved.
b. Where glide slope or localizer roughness or a displaced threshold holds the ILS landing minimums up to no more than 300¾, minimums of RVR 4000 (without regard to meteorological ceiling) may be approved provided the runway meets the requirements for RVR (paragraph 6 above) and the obstruction clearance requirements for ILS minimums of 200½.
c. If visual contact is not made at the minimum descent altitude approved for the runway and type of approach being conducted, the missed approach will be immediately executed. The minimum decent altitude is normally 200 feet above the runway when RVR 2600 or RVR 2000 is approved, and it will always be shown on the Coast and Geodetic approach chart.

9. OPERATIONAL USE OF RVR.

a. Whenever the latest weather report furnished by the U.S. Weather Bureau or a source approved by the Weather Bureau, including an oral report from the control tower, contains a visibility value specified as runway visual range or runway visibility for a particular runway of an airport, such visibility value will control for all straight-in instrument approaches, landings, and takeoffs for that runway, regardless of the reported prevailing visibility for the airport.
b. Runway visual range is authorized as the operating minimum for LANDING without regard to reported meteorological ceiling, only at airports where the basic meteorological minimums are 300¾ or less and all of the required aids and related airborne equipment are in satisfactory operating condition. Descent below the minimum authorized altitude for the approach will not be made unless

visual contact with the approach lights has been established, or the aircraft is clear of clouds.

c. In the event it is not possible to use RVR as an operating landing minimum, without regard to ceiling, due to required equipment being inoperative or for other reasons, the appropriate minimum specified for the airport will apply together with a RVR minimum, which shall be used in lieu of the meteorological visibility minimum specified for the airport. Such RVR minimums will be determined in accordance with the following:

Meteorological Visibility	*RVR*
½	2600 feet
¾	4000 feet
1	5200 feet
1¼	6000 feet

d. Whenever the transmissometer is inoperative or runway visibility measurements (RVR or RVV) are otherwise not available, the meteorological ceiling and visibility minimums specified for the airport are applicable. The foregoing also applies to airports where basic ILS or PAR meteorological weather minimums are greater than 300¾.

10. RVR SYSTEMS LIMITATIONS.

a. The advantages of RVR are that the visibility is determined in the area where the landing or takeoff is to be made and not from a point which may be a considerable distance away. Also, RVR takes advantage of the ability of high-intensity runway lights to penetrate obstructions to vision such as fog and haze. Further, it is not subject to variations that would exist between different runway observers, and it is on the job continuously.

b. The limitation is that RVR samples the transmissivity of the atmosphere over a 500′ baseline (750′ in the early installations) and extrapolates RVR values up to 6000′. Obviously, the visibility may vary along the runway from that sampled and this will not be reflected in the reported RVR value. However, experience has shown that in a large majority of cases it is representative of the visibility along the entire runway. Also, it should be understood that RVR is not a slant-range visibility along the glide path. It is what a pilot touching down or taking off on the runway would see in terms of high-intensity runway lights.

11. REPORTING OF RUNWAY VISUAL RANGE.

a. When RVR becomes operational at an airport, it is reported irrespective of the subsequent operation or nonoperation of navigational or visual aids required for the application of RVR as a take-off or landing minimum.

b. RVR will be reported as inoperative (RVRNO) only when the transmissometer is inoperative or the high-intensity runway lights are inoperative.

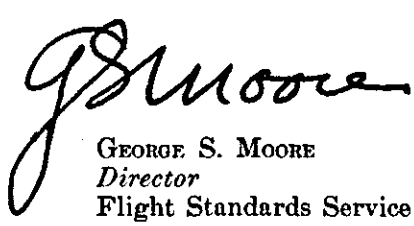
c. When RVR on the instrument runway is 6000′ or less and/or prevailing visibility is 1½ miles or less, RVR will be reported by approach control on initial contact and subsequently as requested to each pilot intending to land straight-in on the instrument runway.

d. When RVR on the instrument runway is 4,000′ or less, RVR will be reported by the local controller or PAR controller on the initial contact and subsequently as required to each pilot intending to land straight-in on the instrument runway.

e. When RVR on the instrument runway is 6000′ or less and/or the prevailing visibility is 1½ miles or less, the RVR will be reported by the local controller or ground controller to each pilot intending to depart on the instrument runway.

f. A ten-minute mean of RVR values is contained in the hourly weather teletype reports for those runways equipped with RVR. However, the RVR reported to you on approach or takeoff is a one-minute mean.

THIS IS AN EFFECTIVE TOOL TO AID YOU IN MAKING YOUR FLIGHTS AS SAFE AS POSSIBLE. USE IT WHENEVER AVAILABLE.



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