CHAPTER 9

SKY CONDITION

9.1 General

Sky condition is a description of the appearance of the sky. Sky condition may be evaluated either automatically by instrument or manually with or without instruments.

9.2 Scope

This chapter prescribes the standards for observing and reporting sky condition.

9.3 Sky Condition Parameters

Sky condition parameters are:

a. **Sky cover.** The amount of the celestial dome hidden by clouds and/or obscurations.

b. **Summation layer amount.** A categorization of the amount of sky cover at and below each reported layer.

c. **Layer height.** The height of the bases of each reported layer of clouds and/or obscurations; or the vertical visibility into an indefinite ceiling.

d. **Ceiling.** The lowest layer aloft reported as broken or overcast; or the vertical visibility into an indefinite ceiling.

e. **Type of clouds.** The variety of clouds present.

9.4 Sky Condition Standards

9.4.1 Sky Condition Observing Standards. Sky condition shall be evaluated at all stations with this capability. Automated stations shall have the capability to evaluate sky condition from the surface to at least 12,000 feet. Observers at manual stations shall evaluate all clouds and obscurations visible; the 12,000 foot restriction shall not apply.

a. **Layer Opacity.** All cloud layers and obscurations shall be considered as opaque.

b. **Surface.** The surface shall be the assigned field elevation of the station. At stations where the field elevation has not been established, the surface shall be the ground elevation at the observation site.

c. **Sky Cover.** Sky cover shall include any clouds or obscurations detected from the observing location.

d. **Stratification of Sky Cover.** Sky cover shall be separated into layers with each layer containing clouds and/or obscurations (i.e., smoke, haze, fog, etc.) with bases at about the same height.

e. **Evaluation of Interconnected Layers.** Clouds formed by the horizontal extension of swelling cumulus or cumulonimbus, that are attached to a parent cloud, shall be regarded as a separate layer only if their bases appear horizontal and at a different level from the parent cloud. Otherwise, the entire cloud system shall be regarded as a single layer at a height corresponding to the base of the parent cloud.

f. **Sky Condition Range, Accuracy, and Resolution.** The required range, accuracy, and resolution for sky condition is listed in Appendix C.

9.4.2   Sky Cover

a. **Clear Skies.**   When no clouds or obscurations are observed or detected from the point of observation.

b. **Layer Amounts.** The amount of sky cover for each layer shall be the eighths (or oktas) of sky cover attributable to clouds or obscurations (i.e., smoke, haze, fog, etc.) in the layer being evaluated.

c. **Summation Layer Amount.** The sky cover summation amount for any given layer is the sum of the sky cover for the layer being evaluated plus the sky cover of all lower layers including obscurations. Portions of layers aloft detected through lower layers aloft shall not increase the summation amount of the higher layer. No layer can have a summation amount greater than 8/8ths.

d. **Variable Amounts of Sky Cover.** The sky cover shall be considered variable if it varies by one or more reportable values (FEW, SCT, BKN, or OVC) during the period it is being evaluated.

9.4.3   Obscuration. The portion of sky (including higher clouds, the moon, or stars) hidden by weather phenomena either surface-based or aloft.

9.4.4   Vertical Visibility. Vertical visibility shall be either:

a. The distance that an observer can see vertically into an indefinite ceiling;

b. The height corresponding to the top of a ceiling light projector beam;

c. The height at which a ceiling balloon completely disappears during the presence of an indefinite ceiling; or

d. The height determined by the sensor algorithm at automated stations.

9.4.5   Ceiling. The ceiling shall be the lowest layer aloft reported as broken or overcast. If the sky is totally obscured, the vertical visibility shall be the ceiling.

9.4.6   Significant Clouds and Cloud Types. Cloud types shall be identified in accordance with the WMO International Cloud Atlas-Volumes I and II, the WMO *Abridged International Cloud Atlas*, or agency observing aids for cloud identification. Cumulonimbus, including cumulonimbus mammatus, towering cumulus, altocumulus castellanus, standing lenticular, or rotor clouds are significant clouds.

9.4.7   Height of Sky Cover. A ceilometer, if available, or ceiling light, or known heights of unobscured portions of abrupt, isolated objects within 1 1/2 statute miles of a runway shall be used to measure the height of layers aloft. Otherwise, an alternative method shall be used to estimate the heights. The height may be estimated by using a ceiling balloon, pilot report, other agency guidelines, or observer experience.

a. **Indefinite Ceiling Height (Vertical Visibility).** The height into an indefinite ceiling shall be the vertical visibility measured in hundreds of feet.

b. **Height of Layers.** The height of a layer shall be the height of the cloud bases or obscurations for the layer being evaluated. Layers of clouds that are 50 feet or less above the surface shall be observed as layers with a height of zero. When the height of a ceiling layer increases and decreases rapidly by the amounts given in Table 9-2, during the period of evaluation, it shall be considered variable and the ascribed height shall be the average of all the varying values. At mountain stations, clouds below the level of the station may be observed.

Table 9-1. Criteria for Variable Ceiling

Ceiling (feet)	Variation (feet)
# 1,000	$200
>1,000 and #2,000	$400
>2,000 and <3,000	$500

9.5   Sky Cover Reporting Standards

9.5.1   Frequency for Sky Cover. Sky cover shall be included in all reports.

9.5.2   Layer Amount.

The amount of sky cover reported for each layer shall be based on the summation layer amount for that layer. The amount shall be reported using the reportable contractions given in Table 9-2.

Automated stations shall report no more than three layers. The selection of layers reported shall be made in accordance with Table 9-3. Manual stations shall report no more than six layers. If more than six layers are observed, then use Table 9-3 to determine which layers are to be reported. Additionally, all layers with associated cumulonimbus or towering cumulus shall be identified by appending the contractions **CB** and **TCU**, respectively.

Sky condition shall be reported in an ascending order up to the first overcast layer. Layers above 12,000 feet are not reported by automated sky condition sensors. At mountain stations, if the cloud layer is below station level, the height of the layer shall be reported as ///.

Table 9-2. Reportable Contractions for Sky Cover

Reportable Contraction	Meaning	Summation Amount of Layer
VV	Vertical Visibility	8/8
SKC or CLR[1]	Clear	0
FEW[2]	Few	1/8 - 2/8
SCT	Scattered	3/8 - 4/8
BKN	Broken	5/8 - 7/8
OVC	Overcast	8/8
1. The abbreviation **CLR** shall be used at automated stations when no layers at or below 12,000 feet are reported; the abbreviation **SKC** shall be used at manual stations when no layers are reported. 2. Any layer amount less than 1/8 is reported as FEW.		

Table 9-3. Priority for Reporting Layers

Priority	Layer Description
1	lowest few layer.
2	lowest broken layer.
3	overcast layer.
4	lowest scattered layer.
5	second lowest scattered layer.
6	second lowest broken layer.
7	highest broken layer.
8	highest scattered layer.

9.5.3   Units of Measure for Heights. Heights of sky cover shall be evaluated in feet above the surface.

9.5.4   Reportable Values for Sky Cover Height. The reportable values of sky cover height are hundreds of feet. The reportable value increments are given in Table 9-4.

Table 9-4. Increments of Reportable Values of Sky Cover Height

Range of Height Values (feet)	Reportable Increment (feet)
#5,000	To nearest 100
>5,000 but #10,000	To nearest 500
>10,000	To nearest 1,000

9.5.5   Layer Heights. Heights of layers shall be reported in hundreds of feet, rounded to the nearest reportable increment. When a value falls halfway between two reportable increments, the lower value shall be reported. When a cloud layer is 50 feet or less above the surface, the height shall be reported as 000 (see paragraph 9.4.7.b).

9.5.6   Obscuration. When a portion of the celestial dome is obscured, the obscuration (amount of sky cover hidden by the weather phenomena) shall be reported (see paragraph 9.4.3 and Table 9-1). The obscuration shall also be reported as a remark (see paragraph 12.7.1.q).

9.5.7   Variable Ceiling. When the height of the ceiling layer is variable, and the ceiling layer is below 3,000 feet, a remark shall be included in the report giving the range of variability (see paragraphs 9.4.7.b and 12.7.1.p).

9.5.8   Ceiling Height at a Second Location. When automated stations use meteorological discontinuity ceilometer(s), remarks shall be added to identify ceiling height conditions at the second location which differ from the ceiling height in the body of the report (see paragraph 12.7.1.t).

9.5.9   Variable Sky Condition. Variable sky conditions shall be indicated in the remarks of the report (see paragraph 12.7.1.r).

9.5.10 Significant Cloud Types. Significant cloud types shall be indicated in the remarks of the report (see paragraph 12.7.1.s).

9.6 Summary of Sky Condition Observing and Reporting Standards

Table 9-5 summarizes the sky condition observing and reporting at each category of station.

Table 9-5. Summary of Sky Condition Observing and Reporting Standards

Parameter	Reporting Standard
Sky Cover (General)	Sky condition shall be included in all reports.
Height/Number of layers	Report a maximum of three layers at automated stations; otherwise, a maximum of six layers at manual stations.
Variable sky condition	Not evaluated at automated stations.
Variable ceiling height	Evaluated at all stations.
Ceiling height at a second location	Evaluated at automated stations with multiple sensors.
Cloud Types	Not evaluated at automated stations.