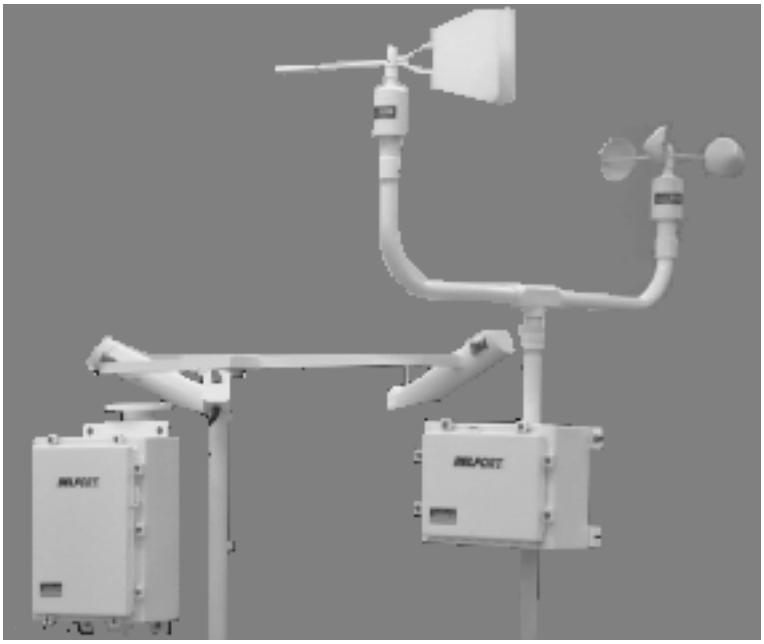

KEY TO DECODING THE U.S. METAR OBSERVATION REPORT

Example METAR Report

METAR KABC 121755Z AUTO 21016G24KT 180V240 1SM R11/P6000FT -RA BR BKN015 0VC025 06/04 A2990 RMK A02 PK WND 20032/25 WSHFT 1715 VIS 3/4V1 1/2 VIS 3/4 RWY11 RAB07 CIG 013V017 CIG 017 RWY11 PRESFR SLP125 POOO3 6OOO9 T00640036 10066 21012 58033 TSNO $

KEY TO DECODING A METAR REPORT		
METAR	TYPE OF REPORT	METAR: hourly (scheduled) report; SPECI: special (unscheduled) report.
KABC	ICAO STATION (location) IDENTIFIER	Four character ICAO location identifier.
121755Z	DATE/TIME group	All dates and times in UTC using a 24-hour clock; two-digit date and four-digit time; always appended with **Z** to indicate UTC.
AUTO	REPORT MODIFIER	**AUTO**: Indicates a fully automated report with no human intervention. It is removed when an observer logs on to the system. **COR**: Indicates a corrected observation. No modifier indicates human observer or automated system with human logged on for oversight functions.

<table>
<tr><td>21016G24KT
180V240</td><td>WIND DIRECTION AND SPEED</td><td>Direction in tens of degrees from true north (first three digits); next two digits: speed in whole knots; if needed, include character as: Gusts (character) followed by maximum observed speed; always appended with KT to indicate knots; 00000KT for calm; if direction varies by 60º or more and speed greater than 6 knots, a Variable wind direction group is reported, otherwise omitted. If wind direction is variable and speed 6 knots or less, replace wind direction with VRB followed by wind speed in knots. Observing and Coding Wind for additional information.</td></tr>
<tr><td>1SM</td><td>VISIBILITY</td><td>Prevailing visibility in statute miles and fractions with space between whole miles and fractions; always appended with SM to indicate statute miles; values <1/4SM reported as M1/4SM.
See Observing and Coding Visibility for additional information.</td></tr>
<tr><td>R11/P6000FT</td><td>RUNWAY VISUAL RANGE</td><td>A 10-minute RVR evaluation value in hundreds of feet is reported if prevailing visibility is < or = 1 mile or RVR < or = 6000 feet; always appended with FT to indicate feet; value prefixed with M or P to indicate value is lower or higher than the reportable RVR value. See Observing and Coding Runway Visual Range for additional information.</td></tr>
<tr><td>-RA BR</td><td>WEATHER PHENOMENA</td><td>Present weather:
<table>
<tr><td colspan="4">QUALIFIER</td></tr>
<tr><td colspan="4">Intensity or Proximity</td></tr>
<tr><td>- Light</td><td>"no sign" Moderate</td><td colspan="2">+ Heavy</td></tr>
<tr><td colspan="4">VC Vicinity: but not at aerodrome; in U.S. METAR, between 5SM and 10SM of the point(s) of observation.</td></tr>
<tr><td colspan="4">Descriptor</td></tr>
<tr><td>MI Shallow
BL Blowing</td><td>BC Patches
SH showers</td><td>PR Partial
DR Drifting</td><td>TS Thunderstorm
FZ Freezing</td></tr>
<tr><td colspan="4">WEATHER PHENOMENA</td></tr>
<tr><td colspan="4">Precipitation</td></tr>
<tr><td>DZ Drizzle
IC Ice Crystals
UP Unknown in automated observations</td><td>RA Rain
PL Ice pellets</td><td>SN Snow
GR Hail</td><td>SG Snow grains
GS Small hail/ snow pellets</td></tr>
<tr><td colspan="4">Obscuration</td></tr>
</table></td></tr>
</table>

		<table><tr><td>BR Mist (< or = 5/8SM) SA Sand</td><td>FU Smoke HZ Haze</td><td>VA Volcanic Ash PY Spray</td><td>DU Widespread Dust</td></tr><tr><td colspan="4">Other</td></tr><tr><td>SQ Squall FC Funnel Cloud</td><td>SS Sandstorm +FC Tornado/ Waterspout</td><td>DS Duststorm</td><td>PO Well developed dust/sand whirls</td></tr></table> See Observing and Coding Present Weather Group for additional information.
BKN015 OVC025	SKY CONDITION	Cloud amount and height: CLR (In automated METAR reports only, no clouds detected below 12000 feet.); **SK**y **C**lear 0/8; **FEW** 1/8-2/8; **SC**a**t**tered 3/8-4/8; **B**o**K**e**N** 5/8-7/8; **OV**er**C**ast 8/8; 3-digit height of base in hundreds of feet; followed by **T**owering **CU**mulus or **C**umulonim**B**us if present. For an observed sky: **V**ertical **V**isibility followed by vertical veisibility in hundreds of feet into the obscuration, example: **VV004**. More than 1 layer may be reported. See Observing and Coding Sky Conditions for additional information.
06/04 OVC025	TEMPERATURE/DEW POINT	Each is reported in whole degrees Celsius using two digits; values are separated by a solidus (/); sub-zero values are prefixed with an **M** (minus). See Observing and Coding Temperature and Dew Point for additional information.
A2990 OVC025	ALTIMETER	Altimeter setting (in U.S. reports) is always prefixed with an **A** indicating inches of mercury; reported using four digits: tens, units, tenths, and hundredths. See Observing and Coding Pressure for additional information.
The following groups are reported in the Remarks section of the METAR report		
RMK	REMARKS IDENTIFIER	Remarks includes clarifying or augmenting data concerning elements in the body of the METAR, additive coded data and maintenance data.

TORNADO, FUNNEL CLOUD or WATERSPOUT	TORNADIC ACTIVITY	Augmented; report should include TORNADO, FUNNEL CLOUD or WATERSPOUT, time (after the hour) of beginning/end, location, movement; e.g., TORNADO B25 N MOVE E See Observing and Coding Remarks for additional information.
AO2	TYPE OF AUTOMATED STATION	AO1; automated station without a precipitation descriminator. AO2; automated station with precipitation descriminator. See Observing and Coding Remarks for additional information.
PK WND 20032/25	PEAK WIND	PK WND dddff(F)/(hh)mm; direction in tens of degrees, speed in whole knots, time in minutes after the hour. Only minutes after the hour is included if the hour can be inferred from the report. See Observing and Coding Remarks for additional information.
WSHFT 1715	WIND SHIFT	WSHFT followed by hours and minutes of occurrence. The term FROPA may be entered after the time if it is reasonably certain that the wind shift was a result of a frontal passage. See Observing and Coding Remarks for additional information and here for wind definitions.
Not on this report	TOWER OR SURFACE VISIBILITY	TWR VIS vvvvv: visibility reported by tower personnel, e.g., TWR VIS 2; SFC VIS vvvvv: visibility reported by ASOS or observer. See Observing and Coding Remarks for additional information and here for visibility criteria and definitions..
VIS 3/4V1 1/2	VARIABLE PREVAILING VISIBILITY	VIS $v_nv_nv_nv_n$ v_n**V**$v_xv_xv_x$ v_xv_x; reported if prevailing visibility is <3 statute miles and variable. See Observing and Coding Remarks for additional information and here for visibility criteria and definitions.
VIS 3/4 RWY11	VISIBILITY AT SECOND LOCATION	VIS vvvvv(LOC); reported if different than the reported prevailing visibility in the body of the report. See Observing and Coding Remarks for additional information and here for visibility criteria and definitions.
Not on this report	LIGHTNING	(FREQUENCY) LTG (LOCATION); when detected the frequency and location is reported, e.g., FRQ LTG NE, meaning frequent lightning to northeast of station. See Observing and Coding Remarks for additional information.

RAB07	BEGINNING AND ENDING OF PRECIPITATION AND THUNDERSTORMS	w'w'B(hh)mmE(hh)mm; TSB(hh)mmE(hh)mm, where w'w' is the present weather precipitation contraction, B indicates began, E indicates ended; (hh) indicates the hour the phenomena began or ended and can be omitted if the hour can be inferred from the report, mm indicates the minutes after the hour the phenomenon began or ended. See Observing and Coding Remarks for additional information.
Not on this report	VIRGA	Augmented to report by human observer; indicates precipitation not reaching the ground is observed. See Observing and Coding Remarks for additional information.
CIG 013V017	VARIABLE CEILING	CIG $h_nh_nh_nVh_x$ h_xh_x; reported if the ceiling in the body of the report is < 3000 feet and variable. See Observing and Coding Remarks for additional information.
CIG 017 RWY11	CEILING HEIGHT AT SECOND LOCATION	CIG hhh[LOC]; Ceiling height reported if secondary ceilometer site ceiling value is different than the ceiling height in the body of the report. See Observing and Coding Remarks for additional information and here for sky condition criteria and definitions.
PRESFR	PRESSURE RISING OR FALLING RAPIDLY	PRESRR or PRESFR; pressure rising or falling rapidly at time of observation. See Observing and Coding Remarks for additional information and here for pressure criteria and definitions.
SLP125	SEA LEVEL PRESSURE	SLPppp; sea level pressure reported for ppp in tens, units, and tenths of hPa. See Observing and Coding Remarks for additional information and here for pressure criteria and definitions.
P0003	HOURLY PRECIPITATION AMOUNT	Prrrr; in tens, units, tenths and hundredths of an inch since last regular hourly METAR. A trace is reported as P0000. See Observing and Coding Remarks for additional information.
60009	3- AND 6-HOUR PRECIPITATION AMOUNT	6RRRR; precipitation amount, including water equivalent, to nearest 0.01 inches for past 6 hours reported in 00, 06, 12, and 18 UTC observations and for past 3 hours in 03, 09, 15, and 21 UTC observations. A trace is 60000. See Observing and Coding Remarks for additional information.

Not on this report	24-HOUR PRECIPITATION AMOUNT	$7R_{24}R_{24}R_{24}R_{24}$; precipitation amount to nearest 0.01 inches for past 24 hours reported in 12 UTC observation; e.g., 70015 indicates 0.15 inches of precipitation for past 24 hours. See Observing and Coding Remarks for additional information.
T00640036	HOURLY TEMPERATURE AND DEW POINT	$Ts_nT_aT_aT_a$ $s_nT'_aT'_aT'_a$; reported to nearest tenth of ^oC; s_n: 1 if temperature or dew point below 0^oC and 0 if temperature/dew point 0^oC or higher. See Observing and Coding Remarks for additional information.
10066	6-HOUR MAXIMUM TEMPERATURE	$1s_nT_xT_xT_x$; maximum temperature for past 6 hours reported to nearest tenth of degree Celsius; reported on 00, 06, 12, 18 UTC reports; s_n = 1 if temperature below 0^oC and 0 if temperature 0^oC or higher.. See Observing and Coding Remarks for additional information.
21012	6-HOUR MINIMUM TEMPERATURE	$2s_nT_nT_nT_n$; minimum temperature for past 6 hours reported to nearest tenth of degree Celsius; reported on 00, 06, 12, 18 UTC reports; s_n = 1 if temperature below 0^oC and 0 if temperature 0^oC or higher.. See Observing and Coding Remarks for additional information.
Not on this report	24-HOUR MAXIMUM AND MINIMUM TEMPERATURE	$4s_nT_xT_x$ $T_xs_nT_nT_nT_n$; maximum temperature for past 6 hours reported to nearest tenth of degree Celsius; reported on midnight local standard time reports; s_n = 1 if temperature below 0^oC and 0 if temperature 0^oC or higher; e.g., 400461006 indicates a 24-hour maximum temperature of 4.6^oC and a 24-hour minimum temperature of -0.6^oC. See Observing and Coding Remarks for additional information.
58033	PRESSURE TENDENCY	5appp; the character (a) and amount of change in pressure (ppp) in tenths of hPa for the past 3 hours. See Observing and Coding Remarks for additional information.
TSNO	SENSOR STATUS INDICATORS	RVRNO: RVR missing; PWINO: precipitation identifier information not available; PNO: precipitation amount not available; FZRANO: freezing rain information not available; TSNO: thunderstorm information not available (may indicate augmenting weather observer not logged on); VISNO [LOC} visibility at second location not available, e.g. VISNO RWY06; CHINO [LOC}: (cloud-height-indicator) sky condition at secondary location not available, e.g., CHINO RWY06. See Observing and Coding Remarks for additional information.

$	MAINTENANCE CHECK INDICATOR	Maintenance is needed on the system. See Observing and Coding Remarks for additional information.
If an element or phenomena does not occur, is missing, or cannot be observed, the corresponding group and space are omitted (body and/or remarks) from that particular report, except for Sea-level Pressure (SLPppp). SLPNO shall be reported in a METAR when the SLP is not available.		

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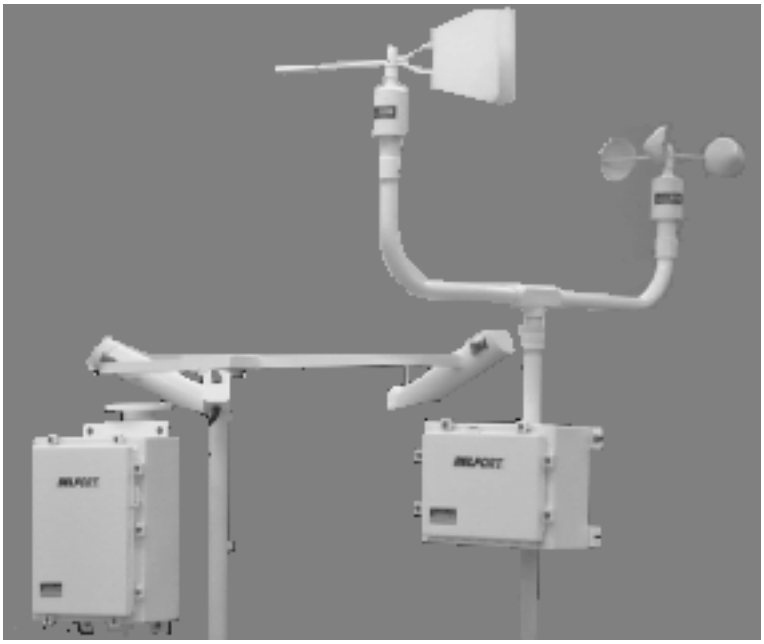

Wind Group (dddff(f)Gfmfm(fm)Kt _dndndnVdxdxdx)

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Definitions, Criteria

Wind Direction.

- The direction, in tens of degrees, from which the wind is blowing with reference to true north.
- The wind direction shall be determined by averaging the direction over a **2-minute period**.
- When the wind direction sensor(s) is out of service, at designated stations, the direction may be estimated by observing the wind cone or tee, movement of twigs, leaves, smoke, etc., or by facing into the wind in an unsheltered area.

Variable Wind Direction.

- The wind direction may be considered variable if, during the 2-minute evaluation period, the wind speed is 6 knots or less.
- Also, the wind direction shall be considered variable if, during the 2-minute evaluation period, it varies by **60 degrees or more** when the average wind speed is **greater than 6 knots**.

Wind Speed.

- The rate, in knots, at which the wind passes a given point.
- The wind speed shall be determined by averaging the speed over a **2-minute period**.
- At designated stations, Table A-1 shall be used to estimate wind speeds when instruments are out of service or the wind speed is below the starting speed of the anemometer in use.
- **Note:** WMO standards indicate the wind speed will be determined from the average over the 10 minutes preceding the observation and reported in meters per second.

Wind Gust.

- The wind speed data for the most recent 10 minutes shall be examined to evaluate the occurrence of gusts.
- Gusts are indicated by rapid fluctuations in wind speed with a variation of 10 knots or more between peaks and lulls.
- The speed of a gust shall be the maximum instantaneous wind speed.
- **Note:** WMO standard defines a gust as the maximum wind speed exceeding the "mean speed" by 5 m/s (10 knots) during the 10-minute interval.

Peak Wind Speed.

- The maximum instantaneous wind speed measured.
- Peak wind data shall be determined with wind speed recorders.
- The peak wind speed shall be the maximum instantaneous speed measured since the last routine METAR.

Wind Shifts.

- Wind data shall be examined to determine the occurrence of a wind shift.
- A wind shift is indicated by a change in wind direction of 45 degrees or more in less than 15 minutes with sustained winds of 10 knots or more throughout the wind shift.

Calm Winds.

- When no motion of air is detected, the wind shall be reported as calm.

Table A-1 Estimating Wind Speed

Table A-1 Estimating Wind Speed			
Knots	**Specifications**	**Knots**	**Specifications**
<1	Calm: smoke rises vertically.	22-27	Large branches in motion; whistling heard in overhead wires; umbrellas used with difficulty
1-3	Direction of wind shown by smoke drift not by wind vanes.	28-33	Whole trees in motion; inconvenience felt walking against wind.
4-6	Wind felt on face; leaves rustle; vanes moved by wind.	34-40	Breaks twigs off trees; impedes progress.
7-10	Leaves and small twigs in constant motion; wind extends light flag.	41-47	Slight structural damage occurs.

11-16	Raises dust, loose paper; small branches moved.	48-55	Trees uprooted; considerable damage occurs.
17-21	Small trees in leaf begin to sway; crested wavelets form on inland waters.	56-71	Widespread damage.

Wind observing and reporting standards are sumarized in Table A-2.

Table A-2 Summary of Wind Observing and Reporting Standards	
Parameter	**Observing and Reporting Standard**
Wind Direction	2-minute average in 10 degree increments with respect to true north is reported.
Wind Speed	2-minute average speed in knots is reported.
Wind Gust	The maximum instantaneous speed in knows in the past 10 minutes is reported.
Peak Gust	The maximum instantaneous speed in knots (since the last scheduled report) shall be reported whenever the speed is greater than 25 knots.
Wind Shifts	Wind shift and the time the shift occurred is reported.

Coding and Interpreting the Coded Wind Groups

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ddd	**Wind Direction**	The wind direction **ddd**, shall be coded in tens of degrees using three figures. Directions less than 100 degrees shall be preceded with a "0". For example, a wind direction of 90º is coded as "090".

---

ff(f)	**Wind Speed**	The wind speed, **ff(f)**, shall be coded in two or three digits immediately following the wind direction. The wind speed shall be coded, in **whole knots**, (for US stations) using the units and tens digits and, if required, the hundreds digit. Speeds of less than 10 knots shall be coded using a leading zero. The wind group shall always end with KT (for US stations) to indicate that wind speeds are reported in knots. For example, a wind speed of 8 knots shall be coded "08KT"; a wind speed of 112 knots shall be coded "112KT". International stations may use meters per second (MPS) or kilometers per hour (KMH) and code the wind speed accordingly.
Gf_mf_m (f_m)	**Gust**	Wind gusts shall be coded in the format, **$Gf_mf_m(f_m)$**. The wind gust shall be coded in two or three digits immediately following the wind speed. The wind gust shall be coded, in whole knots, using the units and tens digits and, if required, the hundreds digit. For example, a wind from due west at 20 knots with gusts to 35 knots would be coded "27020G35KT".
VRB	**Variable Wind Direction (Speed 6 knots or less)**	Variable wind direction with wind speed 6 knots or less may be coded as **VRB** in place of the **ddd**. For example, if the wind is variable at three knots, it would be coded **VRB03KT**.

$d_n d_n d_n$ $Vd_x d_x d_x$	**Variable Wind Direction (Speed greater than 6 knots)**	Variable wind direction with wind speed greater than 6 knots shall be coded in the format, **$d_n d_n d_n V d_x d_x d_x$**. The variable wind direction group shall immediately follow the wind group. The directional variability shall be coded in a clockwise direction. For example, if the wind is variable from 180º to 240º at 10 knots, it would be coded "**21010KT 180V240**".
00000KT	**Calm Wind**	Calm Wind shall be coded as "**00000KT**".

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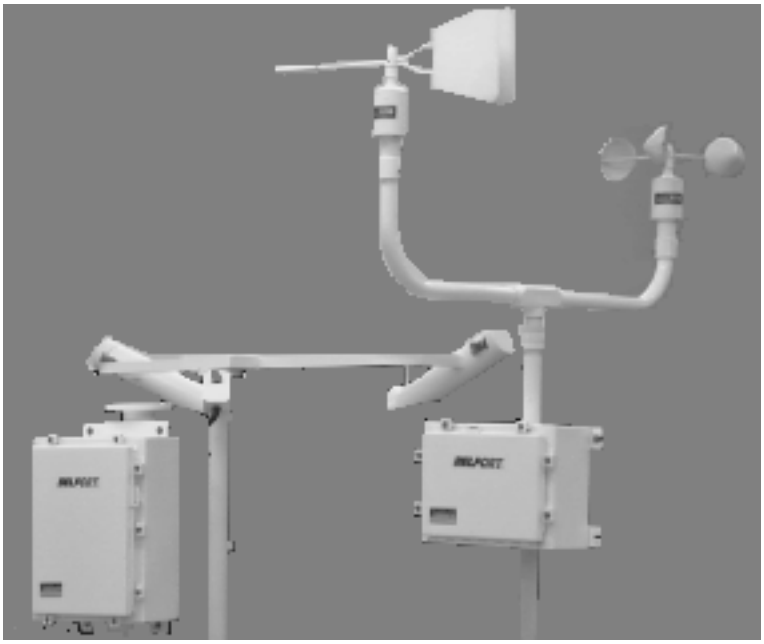

Visibility Group VVVVVSM

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Definitions

Visibility

A measure of the opacity of the atmosphere. An automated, instrumentally-derived visibility value is a sensor value converted to an appropriate visibility value using standard algorithms and is considered to be representative of the visibility in the vicinity of the airport runway complex. A manually-derived visibility value is obtained using the "prevailing visibility" concept. In this section, the term "prevailing visibility" shall refer to both manual and instrument derived values.

Units of Measure

Visibility shall be reported in statute miles at US observing sites. Note: The WMO standard is to report visibility in meters, where 2800 represents 2,800 meters and 9999 represents a visibility greater than 9500 meters (9.5 km).

Prevailing visibility

The greatest distance that can be seen throughout at least half the horizon circle, not necessarily continuous; the visibility that is continuous; the visibility that is considered representative of visibility at the station.

Sector visibility

The visibility in a specified direction that represents at least a 45 degree arc of the horizon circle.
When the manually-derived visibility is not uniform in all directions, the horizon circle shall be divided into arcs that have uniform visibility and represent at least one eighth of the horizon circle (45 degrees). The visibility that is evaluated in each sector is sector visibility. Sector visibility shall be reported in the remarks section when it differs from the prevailing visibility by one or more reportable values and either the prevailing or sector visibility is less than 3 statute miles.

Surface visibility

The prevailing visibility determined from the usual point of observation.

Tower visibility

The prevailing visibility determined from the airport traffic control tower (ATCT) at stations that also report surface visibility.
Tower visibility shall be reported in accordance with agency procedures. See remarks section.

Visibility Observing Standards. Visibility may be manually determined at either the surface, the tower level, or both. If visibility observations are made from just one level, e.g., the airport traffic control tower, that level shall be considered the "usual point of observation" and that visibility shall be reported as surface visibility. If visibility observations are made from both levels, the visibility at the tower level may be reported as tower visibility.

Visibility may be automatically determined by sensors operating in accordance with the Federal Standard Algorithms for Automated Weather Observing Systems Used for Aviation Purposes. This visibility algorithm calculates a mean visibility which is the sensor equivalent of prevailing visibility. The visibility data during the period of observation are examined to determine if variable visibility shall be reported.

Manual Observing Aids. Agencies shall establish procedures to ensure that insofar as possible, dark or nearly dark objects viewed against the horizon sky shall be used during the day, and unfocused lights of moderate intensity (about 25 candela) shall be used during the night as reference points for manually determining visibility. In addition, visibility sensors may be used to assist the observer in the evaluation.

Method of determining visibility. Manually-derived visibility shall be evaluated as frequently as practicable. All available visibility reference points shall be used. The greatest distances that can be seen in all directions around the horizon circle shall be determined. When the visibility is greater than the distance to the farthest reference point, the greatest distance seen in each direction shall be estimated. The estimate shall be based on the appearance of the most distant visible reference points. If they are visible with sharp outlines and little blurring of color, the visibility is much greater than the distance to them. If they can barely be seen and identified, the visibility is about the same as the distance to them. After visibilities have been determined around the entire horizon circle, they shall be resolved into a single value for reporting purposes. To do this, the greatest distance that can be seen throughout at least half the horizon circle, not necessarily continuous shall be used; this is prevailing visibility. If the visibility is varying rapidly during the time of the observation, the average of all observed values across the horizon circle shall be used for reporting purposes. Prevailing visibility shall be reported in all weather observations. The reportable values for visibility are listed in Table A-3. If the actual visibility falls halfway between two reportable values, the lower value shall be reported.

Variable Prevailing Visibility. If the prevailing visibility rapidly increases and decreases by 1/2 statute mile or more, during the time of the observation, and the prevailing visibility is less than 3 miles, the visibility is considered to be variable. The minimum and maximum visibility values observed shall be reported in the remarks section.

Visibility at Second Location. When an automated station uses a meteorological discontinuity visibility sensor, remarks shall be added to identify visibility at the second location which differ from the visibility in the body of the report. See remarks section.

Table A-3 Reportable Visibility Values

Source of Visibility Report							
Automated			**Manual**				
M1/4	2	9[a]	0	5/8	1 5/8	4	12
1/4	2 1/2	10	1/16	3/4	1 3/4	5	13
1/2	3	-	1/8	7/8	1 7/8	6	14
3/4	4	-	3/16	1	2	7	15
1	5	-	1/4	1 1/8	2 1/4	8	20
1 1/4	6[a]	-	5/16	1 1/4	2 1/2	9	25
1 1/2	7	-	3/8	1 3/8	2 3/4	10	30
1 3/4	8[a]	-	1/2	1 1/2	3	11	35[b]

a. These values may not be reported by some automated stations.
b. Further values in increments of 5 statute miles may be reported; i.e., 40, 45, 50, etc.

Table A-4 Summary of Visibility Observing and Reporting Standards and Procedures

Visibility	**Type of Station**	
	Automated	Manual
Surface	Represents 10-minutes of sensor outputs	Visual Evaluation of Visibility around the horizon
Variable	Reported when the prevailing visibility varies by 1/2 mile or more and the visibility is less than 3 miles	
Tower	Augmented	Reported at stations with an ATCT
Sector	Not Reported	Reported at all stations

Coding the Visibility Group

For U.S. Stations:

- The surface visibility, **VVVVVSM**, shall be coded in statute miles using the values listed in Table A-3.
- A space shall be coded between whole numbers and fractions of reportable visibility values.
- The visibility group shall always end with **SM** to indicate that the visibility is in statute miles. For example, a visibility of one and a half statute miles would be coded

  1 1/2SM.

- Automated stations shall use an **M** to indicate "less than" when reporting visibility. For example, **M1/4SM** means a visibility of less than one-quarter statute mile.
- **Note:** The term **CAVOK** is not used in the United States. See below.

International Standard for Reporting Visibility

- WMO standards indicate that horizontal visibility, **VVVV**, is to be reported in whole meters. When the horizontal visibility is not the same in all directions, the **minimum** visibility is given for **VVVV** followed, without a space, by $\mathbf{D_v}$, the direction of the visibility observed given by a one or two letter indicator of the eight points of the compass (N, NE, etc.). If the minimum visibility reported by $\mathbf{VVVVD_v}$ is less than 1500 meters and the maximum visibility in another direction is greater than 5000 meters, then the visibility group $\mathbf{VVVVD_v}$ is followed by the group $V_xV_xV_xV_xDV_v$ which is the maximum visibility and direction.
- The term **CAVOK** is an acceptable contraction (meaning Ceiling and Visibility OK) for international use. It indicates that:

  1. No clouds exist below 5,000 feet or below the highest minimum sector altitude, whichever is greater, and no cumulonimbus are present.

2. Visibility is 10 kilometers or more and,

3. No precipitation, thunderstorms, sandstorm, duststorm, shallow fog, or low drifting dust, sand or snow is occurring.

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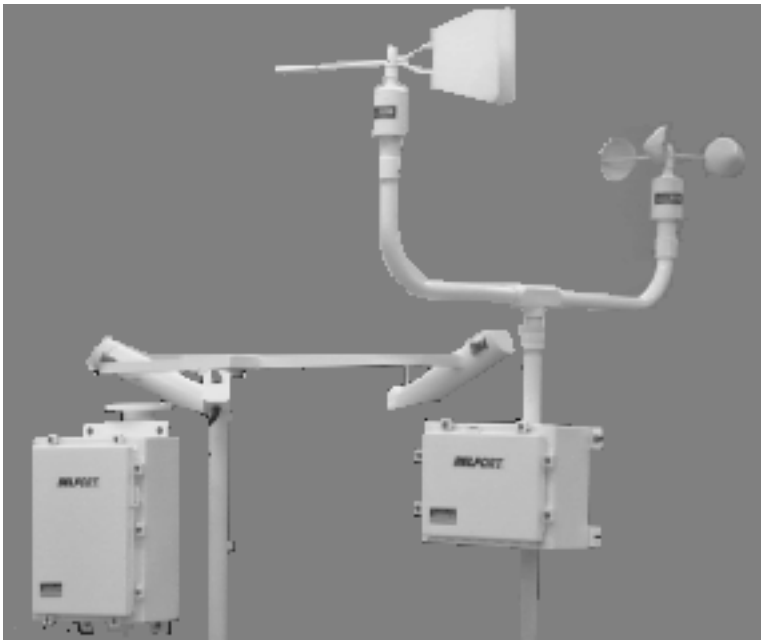
f. Tower or Surface Visibility (TWR_VIS_vvvvv or SFC_VIS_vvvvv). Tower visibility or surface visibility (see paragraphs 6.5.4 and 6.5.5) shall be coded in the formats, TWR_VIS_vvvvv or SFC_VIS_vvvvv, respectively, where vvvvv is the observed tower/surface visibility value. A space shall be coded between each of the remark elements. For example, the control tower visibility of 1 1/2 statute miles would be coded "TWR VIS 1 1/2". g. Variable Prevailing Visibility (VIS_vnvnvnvnvnVvxvxvxvxvx). Variable prevailing visibility shall be coded in the format VIS_vnvnvnvnvnVvxvxvxvxvx, where VIS is the remark identifier, vnvnvnvnvn is the lowest visibility evaluated, V denotes variability between two values, and vxvxvxvxvx is the highest visibility evaluated. There shall be one space following the remark identifier; no spaces between the letter V and the lowest/highest values. For example, a visibility that was varying between 1/2 and 2 statute miles would be coded "VIS 1/2V2" (see paragraphs 6.4.5 and 6.5.3). h. Sector Visibility (VIS_[DIR]_vvvvv) [Plain Language]. The sector visibility shall be coded in the format, VIS_[DIR]_vvvvv, where VIS is the remark identifier, [DIR] defines the sector to 8 points of the compass, and vvvvv is the sector visibility in statute miles, using the appropriate set of values in Table 12-1 (see paragraphs 6.4.6 and 6.5.7). For example, a visibility of 2 1/2 statute miles in the northeastern octant would be coded "VIS NE 2 1/2". i. Visibility At Second Location (VIS_vvvvv_[LOC]). At designated automated stations, the visibility at a second location shall be coded in the format VIS_vvvvv_[LOC], where VIS is the remark identifier, vvvvv is the measured visibility value, and [LOC] is the specific location of the visibility sensor(s) at the station (see paragraph 6.5.6). This remark shall only be generated when the condition is lower than that contained in the body of the report. For example, a visibility of 2 1/2 statute miles measured by a second sensor located at runway 11 would be coded "VIS 2 1/2 RWY11".



Runway Visual Range Group ($RD_RD_R/V_RV_RV_R$ V_RFT or $RD_RD_R/V_nV_nV_n$ $V_nVV_xV_xV_xV_xFT$)

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Definitions and Standards for observing and reporting Runway Visual Range

Runway Visual Range (RVR)

The runway visual range is the maximum distance at which the runway, or the specified lights or markers delineating it, can be seen from a position above a specified point on its centerline. This value is normally determined by visibility sensors located alongside and higher than the center line of the runway. **RVR** is calculated from visibility, ambient light level, and runway light intensity. It is common practice to use a transmissometer or forward scatter meter as the RVR visibility sensor. A transmissometer measures the transmittance of the atmosphere over a baseline distance while a forward scatter meter measures the extinction coefficient of the atmosphere. RVR is then derived from equations that also account for ambient light (background luminance) and runway light intensity based on the expected detection sensitivity of the pilot's eye.

Observing Positions

The location of the RVR visibility sensor should be within 500 feet of the runway centerline and within 1,000 feet of the designated runway threshold.

Day-Night Observations for Transmissometers

The day scale shall be used in the evening until low intensity lights on or near the airport complex are clearly visible. The night scale shall be used in the morning until these lights begin to fade. Alternately, a day-night switch may be used to determine which scale should be used.

Multiple Runway Visual Range Sensors

At automated stations where it is applicable, RVR values for as many as four designated runways can be reported for long-line dissemination. At manual stations, only RVR for the designated runway shall be reported.

Units of Measure

RVR is measured in increments of 100 feet up to 1,000 feet, increments of 200 feet from 1,000 feet to 3,000 feet, and increments of 500 feet above 3,000 feet to 6,000 feet.

Runway Visual Range Based on a Transmissometer

Ten-minute extreme values (highest and lowest) of transmittance shall be reported. Manually reported RVR shall be based on light setting 5 for either day or night time conditions, regardless of the light setting actually in use. One RVR value shall be reported if the ten-minute high and low value are the same.

Table A-5 summarizes the runway visual range observing and reporting standards.

Table A-5 Summary of RVR Observing and Reporting Standards

RVR	Observing and Reporting Standard
Number of RVRs	Up to 4[a]
RVR Light Setting	5 for transmissometer systems
When Reported	When visibility less than or equal to 1 statute mile AND/OR RVR less than or equal to 6,000 feet

a. Manual Observations shall contain only one RVR

Coding and Decoding the Runway Visual Range Group

1. **RVR** shall be coded in the format, **R**D_RD_R/ $V_RV_RV_RV_R$FT, where **R** indicates that the runway number follows, $\mathbf{D_RD_R}$ is the runway number (an additional D_R may be used for runway approach directions, such as **R** for right, **L** for left, and **C** for center), V_RV_R V_RV_R is the constant reportable value, and **FT** indicates that units of measurement are feet. A solidus "/" without spaces separates the runway number from the constant reportable value. For example, an **RVR** value for runway 01L of 800 feet would be coded

   R01L/0800FT.

2. RVR that is varying shall be coded in the format, RD_RD_R/$V_nV_nV_n$ V_n**V**$V_xV_xV_xV_x$FT, where **R** indicates that the runway number follows, D_RD_R is the runway number (an additional D_R may be used for runway approach directions, such as **R** for right, **L** for left, and **C** for center), $V_nV_nV_nV_n$ is the lowest reportable value in feet, **V** separates lowest and highest visual range values, $V_xV_xV_xV_x$ is the highest reportable value, and **FT** indicates that units of measurement are feet. A solidus "/" without spaces separates the runway number from the reportable values. For example, the 10-minute RVR for runway 01L varying between 600 and 1,000 feet would be coded

   R01L/0600V1000FT.

3. The values shall be based on light setting 5 at manual stations regardless of the light setting actually in use.

4. RVR values shall be coded in increments of 100 feet up to 1,000 feet, increments of 200 feet from 1,000 feet to 3,000 feet, and increments of 500 feet from 3,000 feet to 6,000 feet.

5. Manual RVR shall not be reported below 600 feet. For automated stations, RVR may be reported from up to four designated runways.

6. If the RVR is less than its lowest reportable value, the V_R $V_RV_RV_R$ or $V_nV_nV_nV_n$ groups shall be preceded by **M**. If the RVR is greater than its highest reportable value, the $V_RV_RV_R$ V_R or $V_xV_xV_xV_x$ groups shall be preceded by a **P**. For example, an RVR for runway 01L of less than 600 feet will be coded

   R01L/M0600FT.

   An RVR for runway 27 of greater than 6,000 feet will be coded

   R27/P6000FT.

Note: ICAO standards indicate runway visual range is reported in meters when visibility is less than 1500 meters. The designator i in the ICAO format is the RVR tendency, either a **U** (for increasing) or a **D** (for decreasing) if during the 10 minutes preceding the observation the runway visual range showed a tendency to increase or decrease. If no change occurred, it is omitted.

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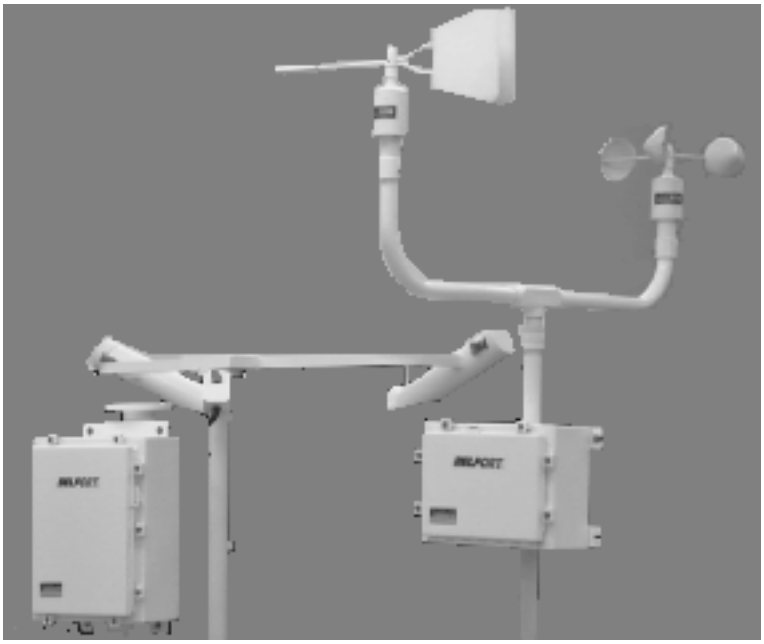

Remarks Section for the METAR/ /SPECI Code

Index

General

Remarks shall be included in all **METAR** and **SPECI**, if appropriate.

Note: The United States does not report remarks in the same manner as the WMO standard.

Remarks shall be separated from the body of the report by a space and the contraction **RMK**. If there are no remarks, the contraction **RMK** is not required.

METAR/SPECI remarks fall into 2 categories: (1) Automated, Manual, and Plain Language, and (2) Additive and Maintenance Data.

Remarks shall be made in accordance with the following:

- Where plain language is called for, authorized contractions, abbreviations, and symbols should be used to conserve time and space. However, in no case should an essential remark, of which the observer is aware, be omitted for the lack of readily available contractions. In such a case, the only

requirement is that the remark be clear.

- Time entries shall be made in minutes past the hour if the time reported occurs during the same hour the observation is taken. Hours and minutes shall be used if the hour is different, or this handbook prescribes the use of the hour and minutes.

- Present weather coded in the body of the report as **VC** may be further described, i.e., direction from the station, if known. Weather phenomena beyond 10 statute miles of the point(s) of observation shall be coded as distant (**DSNT**) followed by the direction from the station. For example, precipitation of unknown intensity within 10 statute miles east of the station would be coded as "**VCSH E**"; lightning 25 statute miles west of the station would be coded as "**LTG DSNT W**".

- Distance remarks shall be statute miles except for automated lightning remarks which are in nautical miles.

- Movement of clouds of weather, if known, shall be coded with respect to the direction toward which the phenomena is moving. For example, a thunderstorm moving toward the northeast would be coded as "**TS MOV NE**".

- Directions shall use the eight points of the compass coded in clockwise order.

- Insofar as possible, remarks shall be entered in the order they are presented in the following paragraphs.

Automated, Manual, and Plain Language Remarks

These remarks generally elaborate on parameters reported in the body of the report. Automated and manual remarks may be generated either by an automated or manual station. Plain language remarks are only provided from manual stations.

1. **Volcanic Eruptions (Plain Language)**. Volcanic eruptions shall be coded. The remark shall be plain language and contain the following, if known:

    - Name of volcano.
    - Latitude and longitude or the direction and the approximate distance from the station.
    - Date/Time (UTC) of the eruption.
    - Size description, approximate height, and direction of movement of the ash cloud.
    - Any other pertinent data about the eruption.

    For example, a remark on a volcanic eruption would look like the following:

    MT. AUGUSTINE VOLCANO 70 MILES SW ERUPTED 231505 LARGE ASH CLOUD EXTENDING TO APRX 30000 FEET MOVING NR.

    Pre-eruption volcanic activity shall not be coded. Pre-eruption refers to unusual and/or increasing volcanic activity which could presage a volcanic eruption.

2. **Funnel Cloud (Tornadic activity_B/E(hh)mm_LOC/DIR_(MOV))**. At manual stationS, tornadoes, funnel clouds, or waterspouts shall be coded in the format, **TORNADIC ACTIVITY_B/E(hh)mm_LOC/DIR_(MOV)**, where:

    - **TORNADO**, **FUNNEL CLOUD**, or **WATERSPOUT** identifies the specific tornadic activity,
    - **B/E** denotes the beginning and/or ending time,
    - **(hh)mm** is the time of occurrence (only the minutes are required if the hour can be inferred from the time of the report),

- **LOC/DIR** is the location and/or direction of the phenomena from the station, and
- **MOV** is the movement, if known, from the station.

Tornadic activity shall be coded as the first remark after the "**RMK**" entry. For example, "**TORNADO B13 6 NE**" would indicate that a tornado, which began at 13 minutes past the hour, was 6 statute miles northeast of the station.

3. **Type of Automated Station (AO1 or AO2)**. **AO1** or **AO2** shall be coded in all **METAR/SPECI** from automated stations.
   - **AO1 -** Automated stations without a precipitation discriminator.
   - **AO2 -** Automated stations with a precipitation discriminator.
4. **Peak Wind (PK_WND_dddff(f)/(hh)mm)**. The peak wind shall be coded in the format, **PK_WND_dddff(f)/(hh)mm** of the next **METAR**, where:
   - **PK_WND** is the remark identifier,
   - **ddd** is the direction of the peak wind,
   - **ff(f)** is the peak wind speed since the last **METAR**, and
   - **(hh)mm** is the time of occurrence (only the minutes are required if the hour can be inferred from the report time).

   There shall be a space between the two elements of the remark identifier and the wind direction/speed group. A solidus "/" (without spaces) shall separate the wind direction/speed group and the time. For example, a peak wind of 45 knots from 280 degrees that occurred at 15 minutes past the hour would be coded "**PK WND 28045/15**".
5. **Wind Shift (WSHFT_(hh)mm)**. A wind shift shall be coded in the format **WSHFT_(hh)mm**, where:

- **WSHFT** is the remark identifier and
- **(hh)mm** is the time the wind shift began (only the minutes are required if the hour can be inferred from the report time).

The contraction **FROPA** may be entered following the time if it is reasonably certain that the wind shift was the result of a frontal passage. There shall be a space between the remark identifier and the time and, if applicable, between the time and the frontal passage contraction. For example, a remark reporting a wind shift accompanied by a frontal passage that began at 30 minutes after the hour would be coded as "**WSHFT 30 FROPA**".

6. **Tower or Surface Visibility (TWR_VIS_vvvvv or SFC_VIS_vvvvv)**. Tower visibility or surface visibility shall be coded in the formats, **TWR_VIS_vvvvv** or **SFC_VIS_vvvvv**, respectively, where:
   - **vvvvv** is the observed tower/surface visibility value. A space shall be coded between each of the remark elements. For example, the control tower visibility of 1 1/2 statute miles would be coded "**TWR VIS 1 1/2**".
7. **Variable Prevailing Visibility (VIS_v_nv_n v_nv_nV$v_xv_xv_x$ v_xv_x)**. Variable prevailing visibility shall be coded in the format **VIS_v_n $v_nv_nv_n$Vv_xv_x $v_xv_xv_x$** where:
   - **VIS** is the remark identifier, **v_n $v_nv_nv_n$** is the lowest visibility evaluated,
   - **V** denotes variability between two values, and **$v_xv_xv_xv_xv_x$** is the highest visibility evaluated.

There shall be one space following the remark identifier; no spaces between the letter **V** and the lowest/highest values. For example, a visibility that was varying between 1/2 and 2 statute miles would be coded "**VIS 1/2V2**".

8. **Sector Visibility (VIS_[DIR]_vvvvv){Plain Language]**. The sector visibility shall be coded in the format **VIS_[DIR]_vvvvv**, where:

    - **VIS** is the remark identifier,
    - [**DIR**] defines the sector to 8 points of the compass, and
    - **vvvvv** is the sector visibility in statute miles, using the appropriate set of values in Table A-3.

    For example, a visibility of 2 1/2 statute miles in the northeastern octant would be coded "**VIS NE 2 1/2**".

9. **Visibility At Second Location (VIS_vvvvv_[LOC])**. At designated automated stations, the visibility at a second location shall be coded in the format **VIS_vvvvv_[LOC]**, where:

    - **VIS** is the remark identifier,
    - **vvvvv** is the measured visibility value, and
    - **[LOC]** is the specific location of the visibility sensor(s) at the station.

    This remark shall only be generated when the condition is lower than that contained in the body of the report. For example, a visibility of 2 1/2 statute miles measured by a second sensor located at runway 11 would be coded "**VIS 2 1/2 RWY11**".

10. **Lightning (Frequency_LTG(type)_[LOC])**.

    - When lightning is observed at a manual station, the frequency, type of lightning, and location shall be reported. The remark shall be coded in the format **Frequency_LTG(type)_[LOC]**. The contractions for the type and frequency of lightning shall be based on Table A-22. For example, "**OCNL LTGICCG OHD**", "**FRQ LTG VC**", or "**LTG DSNT W**".

- When lightning is detected by an automated system:
  - Within 5 nautical miles of the Airport Location Point (ALP), it will be reported as **TS** in the body of the report with no remarks.
  - Between 5 and 10 nautical miles of the ALP, it will be reported as **VCTS** in the body of the report with no remarks.
  - Beyond 10 but less than 30 nautical miles of the ALP, it will be reported in remarks only as **LTG DSNT** followed by the direction from the ALP.

Table A-22. Type and Frequency of Lightning		
Type of Lightning		
Type	**Contraction**	**Definition**
Cloud-ground	CG	Lightning occurring between cloud and ground.
In-cloud	IC	Lightning which takes place within the cloud.
Cloud-cloud	CC	Streaks of lightning reaching from one cloud to another.
Cloud-air	CA	Streaks of lightning which pass from a cloud to the air, but do not strike the ground.
Frequency of Lightning		
Frequency	**Contraction**	**Definition**
Occasional	OCNL	Less than 1 flash per minute.
Frequent	FRQ	About 1 to 6 flashes per minute.
Continuous	CONS	More than 6 flashes per minute.

11. **Beginning and Ending of Precipitation (w'w'B(hh)mmE(hh)mm)**. At designated stations, the beginning and ending of precipitation shall be coded in the format, **w'w'B(hh)mmE(hh)mm**, where:
    - **w'w'** is the type of precipitation,
    - **B** denotes the beginning,

- **E** denotes the ending, and
- **(hh)mm** is the time of occurrence (only the minutes are required if the hour can be inferred from the report time).

There shall be no spaces between the elements. The coded remarks are not required in **SPECI** and should be reported in the next **METAR**. Intensity qualifiers shall not be coded. For example, if rain began at 0005, ended at 0030, and snow began at 0020, and ended at 0055, the remarks would be coded "**RAB05E30SNB20E55**". If the precipitation were showery, the remark would be coded "**SHRABO5E30SHSNB20E55**".

12. **Beginning and Ending of Thunderstorms (TSB(hh)mmE(hh)mm)**. The beginning and ending of thunderstorm(s) shall be coded in the format, **TSB(hh)mmE(hh)mm**, where:
    - **TS** indicated thunderstorm,
    - **B** denotes the beginning,
    - **E** denotes the ending, and
    - **(hh)mm** is the time of occurrence (only the minutes are required if the hour can be inferred from the report time).

    There shall be no spaces between the elements. For example, if a thunderstorm began at 0159 and ended at 0230, the remark would be coded "**TSB0159E30**".

13. **Thunderstorm Location (TS_LOC_(MOV_DIR)) [Plain Language]**. Thunderstorm(s) shall be coded in the format, **TS_LOC_(MOV_DIR)**, where:
    - **TS** identifies the thunderstorm activity,
    - **LOC** is the location of the thunderstorm(s) from the station, and

- **MOV_DIR** is the movement with direction, if known.

For example, a thunderstorm southeast of the station and moving toward the northeast would be coded "**TS SE MOV NE**".

14. **Hailstone Size (GR_[size])[Plain Language]**. At designated stations, the hailstone size shall be coded in the format, **GR_[size]**, where:

    - **GR** is the remark identifier and
    - **[size]** is the diameter of the largest hailstone. The hailstone size shall be coded in 1/4 inch increments.

    For example, "**GR 1 3/4**" would indicate that the largest hailstones were 1 3/4 inches in diameter. If **GS** is coded in the body of the report, no hailstone size remark is required.

15. **Virga (VIRGA_(DIR)) [Plain Language]**. Virga shall be coded in the format, **VIRGA_(DIR)** where:

    - **VIRGA** is the remark identifier and
    - **DIR** is the direction from the station. The direction of the phenomena from the station is optional, e.g., "**VIRGA**" or "**VIRGA SW**".

16. **Variable Ceiling Height (CIG_h_nh_n h_nV$h_xh_xh_x$)**. The variable ceiling height shall be coded in the format, **CIG_h_nh_n h_nV$h_xh_xh_x$**, where:

    - **CIG** is the remark identifier,
    - **$h_nh_nh_n$** is the lowest ceiling height evaluated,
    - **V** denotes variability between two values, and
    - **$h_xh_xh_x$** is the highest ceiling height evaluated.

    There shall be one space following the remark identifier; no spaces between the letter **V** and the lowest/highest ceiling values. For example, "**CIG 005V010**" would indicate a ceiling that was varying between 500 feet and 1,000 feet.

17. **Obscurations (w'w'_[$N_sN_sN_s$] $h_sh_sh_s$) [Plain Language]**. Obscurations (surface-based or aloft) shall be coded in the format, **w'w'_[N_s N_sN_s]$h_sh_sh_s$**, where:

    - **w'w'** is the weather causing the obscuration at the surface or aloft,
    - **$N_sN_sN_s$**, is the applicable sky cover amount of the obscurations aloft (**FEW**, **SCT**, **BKN**, **OVC**) or at the surface (**FEW**, **SCT**, **BKN**), and
    - **$h_sh_sh_s$** is the applicable height.

    Surface-based obscurations shall have a height of "000". There shall be a space separating the weather causing the obscuration and the sky cover amount; there shall be no space between the sky cover amount and the height. For example, fog hiding 3-4 oktas of the sky would be coded "**FG SCT000**"; a broken layer at 2,000 feet composed of smoke would be coded "**FU BKN 020**".

18. **Variable Sky Condition ($N_sN_sN_s$ ($h_sh_sh_s$)_V_ $N_sN_sN_s$) [Plain Language]**. The variable sky condition remark shall be coded in the format, **$N_sN_sN_s$ ($h_sh_sh_s$)_V_ $N_sN_sN_s$**, where:

    - **$N_sN_sN_s$ ($h_sh_sh_s$)** and **$N_sN_sN_s$** identifies the two operationally significant sky conditions and **V** denotes the variability between the two ranges. If there are several layers with the same sky condition amount, the layer height (**$h_sh_sh_s$**) of the variable layer shall be coded. For example, a cloud layer at 1,400 feet that is varying between broken and overcast would be coded "**BKN014 V OVC**".

19. **Significant Cloud Types [Plain Language]**. The significant cloud type remark shall be coded in all reports in the folling manner:

    1. **Cumulonimbus or Cumulonimbus Mammatus (CB or CBMAM_LOC_(MOV_DIR)**. Cumulonimbus or cumulonimbus mammatus, as appropriate, (for which no thunderstorm is being reported) shall be coded in the format, **CB** or **CBMAM_LOC_(MOV_DIR)**, where:

- **CB** or **CBMAM** is the cloud type,
- **LOC** is the direction from the station, and
- **MOV_DIR** is the movement with direction (if known).

The cloud type, location, movement, and direction entries shall be separated from each other with a space. For example, a **CB** up to 10 statute miles west of the station moving toward the east would be coded **CB W MOV E**. If the **CB** was more than 10 statute miles to the west, the remark would be coded **CB DSNT W**.

2. **Towering Cumulus (TCU_[DIR])**. Towering cumulus clouds shall be coded in the format, **TCU_[DIR]**, where:
   - **TCU** is the cloud type and
   - **DIR** is the direction from the station.

   The cloud type and direction entries shall be separated by a space. For example, a towering cumulus cloud up to 10 statute miles west of the station would be coded **TCU W**.

3. **Altocumulus castellanus (ACC_[DIR])**. Altocumulus castellanus shall be coded in the format, **ACC_[DIR]**, where:
   - **ACC** is the cloud type and
   - **DIR** is the direction from the station.

   The cloud type and direction entries shall be separated by a space. For example, an altocumulus cloud 5 to 10 statute miles northwest of the station would be coded **ACC NW**.

4. **Standing lenticular or Rotor clouds (CLD_[DIR])**. Stratocumulus (**SCSL**), altocumulus (**ACSL**), or cirrocumulus (**CCSL**), or rotor clouds shall be coded in the format, **CLD_[DIR]**, where:

- **CLD** is the cloud type and
- **DIR** is the direction from the station.

The cloud type and direction entries shall be separated by a space. For example, altocumulus standing lenticular clouds observed southwest through west of the station would be coded **ACSL SW-W**; an apparent rotor cloud 5 to 10 statute miles northeast of the station would be coded **APRNT ROTOR CLD NE**; and cirrocumulus clouds south of the station would be coded **CCSL S**.

20. **Ceiling Height at Second Location (CIG_hhh_[LOC])**. At designated stations, the ceiling height at a second location shall be coded in the format, **CIG_hhh_[LOC]**, where:

    - **CIG** is the remark identifier,
    - **hhh** is the measured height of the ceiling, and
    - **[LOC]** is the specific location of the ceilometer(s) at the station.

    This remark shall only be generated when the ceiling is lower than that contained in the body of the report. For example, if the ceiling measured by a second sensor located at runway 11 is broken at 200 feet, the remark would be **CIG 002 RWY 11**.

21. **Pressure Rising or Falling Rapidly (PRESRR/PRESFR)**. At designated stations, when the pressure is rising or falling rapidly at the time of the observation, the remark **PRESRR** (pressure rising rapidly) or **PRESFR** (pressure falling rapidly) shall be included in the report.

22. **Sea-Level Pressure (SLPppp)**. At designated stations, the sea-level pressure shall be coded in the format **SLPppp**, where:

    - **SLP** is the remark identifier and
    - **ppp** is the tens, units, and tenths of the sea-level pressure in hectopascals.

For example, a sea-level pressure of 998.2 hectopascals would be coded as **SLP982**. For a **METAR**, if sea-level pressure is not available, it is coded as **.**

23. **Aircraft Mishap (ACFT_MSHP) [Plain Language]. If a report is taken to document weather conditions when notified of an aircraft mishap, the remark ACFT_MSHP shall be coded in the report but not transmitted. The act of non-transmission shall be indicated by enclosing the remark in parentheses in the record, i.e., ACFT MSHP.**

24. **No SPECI Reports Taken (NOSPECI) [Plain Language]. At manual stations where SPECI's are not taken, the remark NOSPECI shall be coded to indicate that no changes in weather conditions will be reported until the next METAR.**

25. **Snow Increasing Rapidly (SNINCR_[inches-hour/inches on ground]). At designated stations, the snow increasing rapidly remark shall be reported, in the next METAR, *whenever the snow depth increases by 1 inch or more in the past hour*. The remark shall be coded in the format, SNINCR_[inches-hour/inches on ground], where:**

    - **SNINCR is the remark indicator,**
    - **inches-hour is the depth increase in the past hour, and**
    - **inches on ground is the total depth of snow on the ground at the time of the report.**

    The depth increase in the past hour and the total depth on the ground are separated from each other by a solidus /. For example, a snow depth increase of 2 inches in the past hour with a total depth on the ground of 10 inches would be coded SNINCR2/10.

26. **Other Significant Information [Plain Language]. Agencies may add to a report other information significant to their operations, such as information on fog dispersal operations, runway conditions, FIRST or LAST report from station, etc.**

Additive Coded and Automated Maintenance Data

Additive data groups are only reported at designated stations. The maintenance data groups are only reported from automated stations.

1. **Precipitation**

   - **Amount of Precipitation**. The amount of liquid precipitation shall be coded as the depth of precipitation that accumulates in an exposed vessel during the time period being evaluated. The amount of freezing or frozen precipitation shall be the water equivalent of the solid precipitation accumulated during the appropriate time period.

   - **Units of Measure for Precipitation**. Precipitation measurements shall be in inches, tenths of inches, or hundredths of inches depending on the precipitation being measured. See Table A-23.

Table A-23. Units of Measure of Precipitation	
Type of Measurement	**Unit of Measure**
Liquid Precipitation	0.01 inch
Water Equivalent of Solid Precipitation	0.01 inch
Solid Precipitation	0.1 inch
Snow Precipitation	1.0 inch

   - **Depth of Freezing or Frozen Precipitation**. The depth of freezing and/or frozen precipitation shall be the actual vertical depth of the precipitation accumulated on a horizontal surface during the appropriate time period. If snow falls, melts, and refreezes, the depth of ice formed shall be included in the measurement.

     - **Hourly Precipitation Amount (Prrrr)**. At designated automated stations, the hourly precipitation amount shall be coded in the format, **Prrrr**, where:

       - **P** is the group indicator and

- **rrrr** is the water equivalent of all precipitation that has occurred since the last **METAR** (METAR, not a SPECI).

The amount shall be coded in hundredths of an inch. For example, **P0009** would indicate 9/100 of an inch of precipitation fell in the past hour; **P0000** would indicate that less than 1/100 of an inch of precipitation (considered a trace) fell in the past hour.

This group is omitted if no precipitation occurred since the last **METAR**.

- **3- and 6-hour Precipitation (6RRRR)**. At designated stations, the 3- and 6-hourly precipitation group shall be coded in the format **6RRRR**, where:
  - **6** is the group indicator and
  - **RRRR** is the amount of precipitation.

  The amount of precipitation (water equivalent) accumulated in the past 3 hours shall be reported in the 3-hourly report; the amount accumulated in the past 6 hours shall be reported in the 6-hourly report. The amount of precipitation shall be coded in inches, using the tens, units, tenths and hundredths digits of the amount. When an indeterminable amount of precipitation has occurred during the period, **6RRRR** shall be coded **. For example, 2.17 inches of precipitation would be coded 60217. A trace shall be coded 60000.**

- **24-Hour Precipitation Amount ($7R_{24}R_{24}$ $R_{24}R_{24}$). At designated stations, the 24-hour precipitation amount shall be coded in the format, $7R_{24}R_{24}R_{24}R_{24}$, where:**
  - **7 is the group indicator and**
  - **$R_{24}R_{24}R_{24}R_{24}$ is the 24-hour precipitation amount.**

The 24-hour precipitation amount shall be included in the 1200 UTC (or other agency designated time) report whenever more than a trace of precipitation (water equivalent) has fallen in the preceding 24 hours. The amount of precipitation shall be coded by using the tens, units, tenths, and hundredths of inches (water equivalent) for the 24-hour period. If more than a trace (water equivalent) has occurred and the amount cannot be determined, the group shall be coded 7////. For example, 1.25 inches of precipitation (water equivalent) in the past 24 hours shall be coded 70125.

- **Snow Depth on Ground (4/sss). At designated stations, the total snow depth on the ground group shall be coded in the 0000 and 1200 UTC observation whenever there is more than a trace of snow on the ground. It shall be coded in the 0600 and 1800 UTC observation if there is more than a trace of snow on the ground and more than a trace of precipitation (water equivalent) has occurred within the past 6 hours. The remark shall be coded in the format 4/sss, where:**
  - **4/ is the group indicator and**
  - **sss is the snow depth in whole inches using three digits.**

  For example, a snow depth of 21 inches shall be coded as 4/021.

- **Water Equivalent of Snow on Ground (933RRR). At designated stations, the water equivalent of snow on the ground shall be coded each day, in the 1800 UTC report, if the average snow depth is 2 inches or more. The remark shall be coded in the format, 933RRR, where:**
  - **933 is the group indicator and**
  - **RRR is the water equivalent of snow, i.e., snow, snow pellets, snow grains, ice pellets, ice crystals, and hail, on the ground.**

The water equivalent shall be coded in tens, units, and tenths of inches, using three digits. If the water equivalent of consists entirely of hail, the group shall not be coded. A water equivalent of 3.6 inches from snow would be coded as 933036; a water equivalent of 12.5 would be coded as 933125.

2. **Cloud Types (8/$C_L C_M C_H$). At designated stations, the group, 8/$C_L C_M C_H$, shall be reported and coded in 3- and 6-hourly reports when clouds are observed.**

   - **The predominant low cloud (C_L), middle cloud (C_M), and high cloud (C_H), shall be identified in accordance with the WMO International Cloud Atlas, Volumes I and II, or the WMO Abridged International Cloud Atlas or agency observing aids for cloud identification.**
   - **A 0 shall be coded for the low, middle, or high cloud type if no cloud is present in that classification.**
   - **A solidus "/" shall be coded for layers above an overcast.**
   - **If no clouds are observed due to clear skies, the cloud type group shall not be coded.**

   For example, a report of 8/6// would indicate an overcast layer of stratus clouds; a report of 8/903 would indicate cumulonimbus type low cloud, no middle clouds, and dense cirrus high clouds.

3. **Duration of Sunshine (98mmm). At sunshine duration reporting sites, the duration of sunshine that occurred the previous calendar day shall be coded in the 0800 UTC report. If the station is closed at 0800 UTC, the group shall be coded in the first 6-hourly METAR after the station opens. The duration of sunshine shall be coded in the format, 98mmm, where:**

- **98 is the group indicator and**
- **mmm is the total minutes of sunshine.**

The minutes of sunshine shall be coded using the hundreds, tens, and units digits. For examples, 96 minutes of sunshine would be coded 98096. If no sunshine occurred, the group would be coded 98000.

4. **Hourly Temperature and Dew Point ($Ts_nT'T'T's_nT'_dT'_dT'_d$). At designated stations, the hourly temperature and dew point group shall be coded to the tenth of a degree Celsius in the format, $Ts_nT'T'T's_nT'_dT'_dT'_d$ where:**
   - **T is the group indicator,**
   - **s_n is the sign of the temperature,**
   - **T'T'T' is the temperature, and**
   - **$T'_dT'_dT'_d$ is the dew point.**

   The sign of the temperature and dew point shall be coded as 1 if the value is below 0ºC and 0 if the value is 0ºC or higher. The temperature and dew point shall be reported in tens, units, and tenths of degree Celsius. There shall be no spaces between the entries. For example, a temperature of 2.6ºC and dew point of -1.5ºC would be reported in the body of the report as 03/M01 and the $Ts_nT'T'T's_nT'_dT'_dT'_d$ group as T00261015. If dew point is missing, report the temperature; if the temperature is missing, do not report the temperature/dew point group.

5. **6-Hourly Maximum Temperature ($1s_nT_x\ T_xT_x$). At designated stations, the 6-hourly maximum temperature group shall be coded in the format, $1s_nT_x\ T_xT_x$, where:**
   - **1 is the group indicator,**

- **s_n is the sign of the temperature,**
- **$T_xT_xT_x$ is the maximum temperature in tenths of degrees Celsius using three digits.**

The sign of the maximum temperature shall be coded as 1 if the maximum temperature is below 0ºC and 0 if the maximum temperature is 0ºC or higher. For example, a maximum temperature of -2.1ºC would be coded 11021; 14.2ºC would be coded 10142.

6. **6-Hourly Minimum Temperature ($2s_nT_n\ T_nT_n$). At designated stations, the 6-hourly minimum temperature group shall be coded in the format, $2s_nT_nT_nT_n$, where:**
   - **2 is the group indicator,**
   - **s_n is the sign of the temperature,**
   - **$T_nT_nT_n$ is the minimum temperature in tenths of degrees Celsius using three digits.**

   The sign of the minimum temperature shall be coded as 1 if the minimum temperature is below 0ºC and 0 if the minimum temperature is 0ºC or higher. For example, a minimum temperature of -0.1ºC would be coded 21001; 1.2ºC would be coded 20012.
7. **24-hour Maximum and Minimum Temperature ($4s_n\ T_xT_xT_xs_nT_n\ T_nT_n$). At designated stations, the 24-hour maximum temperature and the 24-hour minimum temperature shall be coded in the format, $4s_nT_xT_xT_xs_n\ T_nT_nT_n$, where:**
   - **4 is the group indicator,**
   - **s_n is the sign of the temperature,**

- **$T_xT_xT_x$ is the maximum 24-hour temperature, and**
- **$T_nT_nT_n$ is the 24-hour minimum temperature.**

$T_xT_xT_x$ and $T_nT_nT_n$ shall be coded in tenths of degrees Celsius using three digits. The sign of the maximum or minimum temperature shall be coded as 1 if it is below 0ºC and 0 if it is 0ºC or higher. For example, a 24-hour maximum temperature of 10ºC and a 24-hour minimum temperature of -1.5ºC would be coded 401001015; a 24-hour maximum temperature of 11.2ºC and a 24-hour minimum temperature of 8.4ºC would be coded as 401120084.

8. **3-Hourly Pressure Tendency (5appp). At designated stations, the 3-hourly pressure tendency group shall be coded in the format, 5appp, where:**
   - **5 is the group indicator,**
   - **a is the character of pressure change over the past 3 hours and**
   - **ppp is the amount of barometric change in tenths of hectopascals. See table A-24.**

The amount of barometric change shall be coded using the tens, units, and tenths digits. For example, a steady increase of 3.2 hectopascals in the past three hours would be coded 52032.

Table A-24. Characteristics of Barometer Tendency

Primary Requirement	Description	Code Figure
Atmospheric pressure now higher than 3 hours ago.	Increasing, then decreasing	0
	Increasing, then then steady, or increasing then increasing more slowly.	1
	Increasing steadily or unsteadily.	2
	Decreasing or steady, then increasing; or increasing, then increasing more rapidly.	3

Atmospheric pressure now same as 3 hours ago.	Increasing, then decreasing	0
	Steady	4
	Decreasing, then increasing.	5
Atmospheric pressure now lower than 3 hours ago.	Decreasing, then increasing.	5
	Decreasing then steady; or decreasing then decreasing more slowly.	6
	Decreasing steadily or unsteadily.	7
	Steady or increasing, then decreasing; or decreasing then decreasing moe rapidly.	8

9. Sensor Status Indicators. Sensor status indicators should be reported as indicated below:

- **If the Runway Visual Range should not be reported but is missing, RVRNO shall be coded.**
- **When automated stations are equipped with a present weather identifier and that sensor is not operating, the remark PWINO shall be coded.**
- **When automated stations are equipped with a tipping bucket rain gauge and that sensor is not operating, PNO shall be coded.**
- **When automated stations are equipped when a freezing rain sensor and that sensor is not operating, the remark FZRANO shall be coded.**
- **When automated stations are equipped with a lightning detection system and that sensor is not operating, the remark TSNO shall be coded.**
- **When automated stations are equipped with a secondary visibility sensor that sensor is not operating, the remark VISNO_LOC shall be coded.**

- **When automated stations are equipped with a secondary ceiling height indicator and that sensor is not operating, the remark CHINO_LOC shall be coded.**

10. **Maintenance Indicator. A maintenance indicator sign, $, shall be coded when an automated system detects that maintenance is needed on the system.**

The following shows examples of U.S. METAR formatted observation.

METAR KOXC 231155Z AUTO 34003KT 10SM BKN036 OVC042 17/13 A2994 RMK A01=

PKMJ 231155Z 00000KT 15SM FEW015TCU SCT050 BKN300 27/24 A2985 RMK TCU VC E SLP110 60003 70015 8/801 T02720241 10290 20256 50002=

KTBN 231155Z 34004KT 2 1/2SM BR BKN002 BKN100 OVC250 21/20 A3007 RMK SLP172 70009 8/671 9/521 5////=

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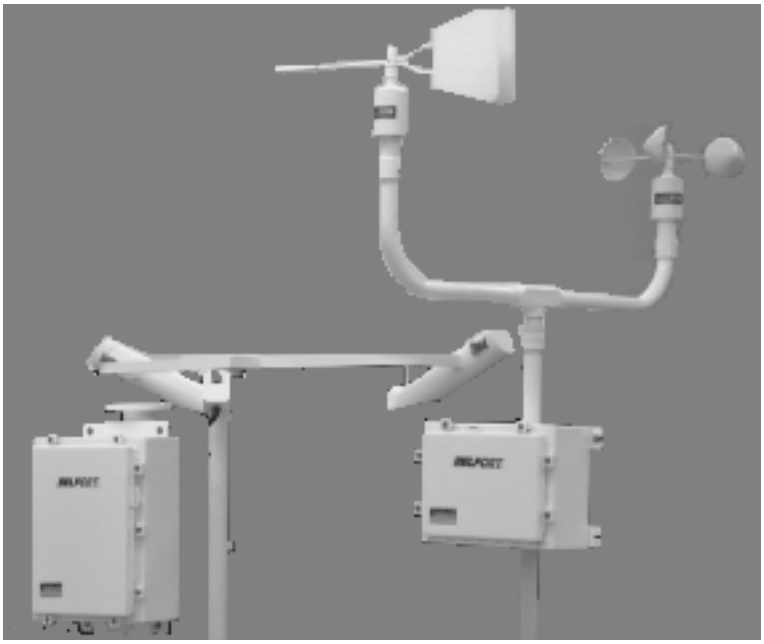

Sky Condition Group
$N_sN_sN_sh_sh_sh_s$
or
$VVh_sh_sh_s$
or
SKC

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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.

Sky Condition Parameter Definitions and Criteria

Sky condition parameters are:

Sky cover

The amount of the celestial dome hidden by clouds and/or obscurations.

Layer amount

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

Automated stations shall report no more than three layers. Manual stations shall report no more than six layers. The selection of layers reported shall be made in accordance with Table A-12. 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 A-12 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.

Summation layer amount

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.

Layer height

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

Heights of sky cover layers and vertical visibility shall be evaluated in feet above the surface. The reportable values of sky cover height are hundreds of feet. Heights of layers shall be reported in hundreds of feet, rounded to the nearest reportable increment. The reportable value increments are given in Table A-17. 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.

Ceiling

The height above the earth's surface of the lowest layer that is reported as broken or overcast; or, if the sky is totally obscured, the vertical visibility shall be the ceiling.

When the height of a ceiling layer increases and decreases rapidly by the amounts given in Table A-13, 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 A-13 Criteria for Variable Ceiling	
Ceiling (feet)	Variation (feet)
< or = 1,000	> or = 200
> 1,000 and < or = 2,000	> or = 400
> 2,000 and < 3,000	> or = 500

Vertical visibility

Vertical visibility shall be either:

- The distance that an observer can see vertically into an indefinite ceiling;
- The height corresponding to the top of a ceiling light projector beam;
- The height at which a ceiling balloon completely disappears during the presence of an indefinite ceiling; or,

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

Indefinite Ceiling Height (Vertical Visibility)

The height into an indifinite ceiling shall be the vertical visibility measured in hundreds of feet.

Type of clouds

The variety of clouds present.

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.

Variable Amounts of Sky Cover

The sky cover shall be considered variable if it varies by one or more of these reportable values, **FEW**, **SCT**, **BKN**, or **OVC**, during the period it is being evaluated.

Obscuration

The portion of the sky (including higher clouds, the moon, or stars) hidden by weather phenomena either surface-based or aloft. If 8/8ths of the sky is obscured the obscuration is considered a **total obscuration**. If only a portion of the sky is obscured, the obscuration is considered a **partial obscuration**. Surface-based obscurations shall have a height of 000 feet. If this surface-based obscuration is total, the ceiling is the vertical visibility into the obscuration.

Sky Condition Standards

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 restrictions shall not apply.

- **Layer Opacity**. All cloud layers and obscurations shall be considered as opaque.
- **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.
- **Sky Cover**. Sky cover shall include any clouds or obscurations detected from the observing location. See Table A-14.

Table A-14. Sky Cover Evaluation

Angle of Advancing or Receding Layer Edge	Eights of Sky Cover	Angular Elevation of Layer Surrounding Station
> 0 to 50º	1	> 0 to 10º
51 to 68º	2	11 to 17º
69 to 82º	3	18 to 24º
83 to 98º	4	25 to 32º
99 to 112º	5	33 to 41º
113 to 129º	6	42 to 53º
130 to 179º	7	54 to 89º
180º	8	90º

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.

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.

Table A-15 is a summary of the sky condition observing and reporting standards.

Table A-15. 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 second location	Evaluated at automated stations with multiple sensors.
Cloud types	Not evaluated at automated stations.

Coding and Decoding the Sky Condition Groups ($N_sN_sN_sh_s$ h_sh_s or $VVh_sh_sh_s$ or SKC/CLR)

Sky cover shall be included in all reports.

- Sky condition shall be coded in the format, $\mathbf{N_sN_s}$ $\mathbf{N_sh_sh_sh_s}$, where $\mathbf{N_sN_sN_s}$ is the summation layer amount of sky cover and $\mathbf{h_sh_sh_s}$ is the height of the layer. There shall be no space between the summation layer amount of sky cover and the height of the layer.
- Sky condition shall be coded in an ascending order up to the first overcast layer. At mountain stations, if the layer is below station level, the height of the layer shall be coded as ///.
- Vertical visibility shall be coded in the format, $\mathbf{VVh_s}$ $\mathbf{h_sh_s}$, where **VV** identifies an indefinite ceiling and $\mathbf{h_sh_sh_s}$ is the vertical visibility into the indefinite ceiling. There shall be no space between the **VV** identifier and the vertical visibility.

- Clear skies shall be coded in the format, **SKC** or **CLR**, where **SKC** is the abbreviation used by manual stations to indicate no layers are present and **CLR** is the abbreviation used by automated stations to indicate no layers are detectedd at or below 12,000 feet.

- Each layer shall be separated from other layers by a space. The sky cover for each layer reported shall be coded by using the appropriate reportable contraction from Table A-16. The report of clear skies (**SKC** or **CLR**) are complete layer reports within themselves. The abbreviations **FEW**, **SCT**, **BKN**, and **OVC** shall be followed without a space, by the height of the layer.

Table A-16. 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.

The height of the base of each layer, $\mathbf{h_s h_s\ h_s}$, shall be coded in hundreds of feet above the surface using three digits in accordance with Table A-17.

Table A-17. Increments of Reportable Values of Sky Cover Height

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

At manual stations, cumulonimbus (**CB**) or towering cumulus (**TCU**) shall be appended to the associated layer. For example, a scattered layer of towering cumulus at 1,500 feet would be coded "**SCT015TCU**" and would be followed by a space if there were additional higher layers to code.

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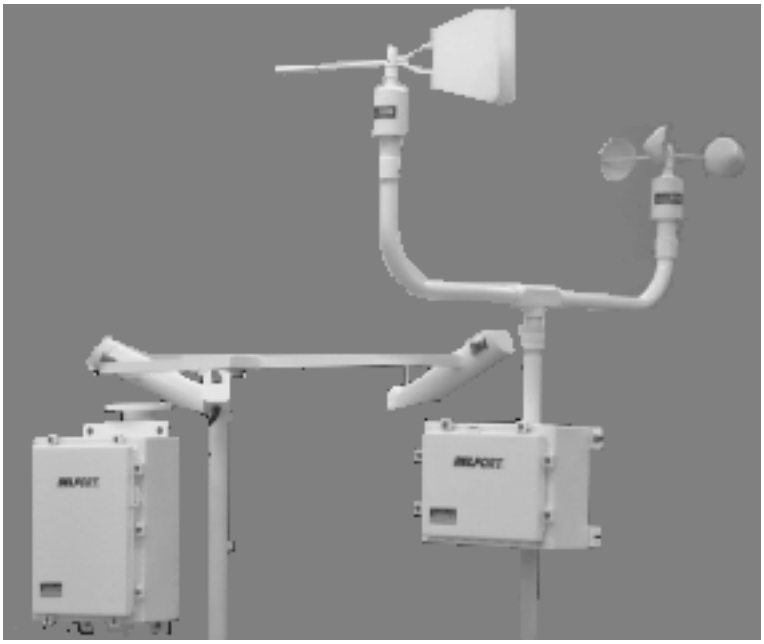

Atmospheric Pressure Groups

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Atmospheric pressure is the force per unit area exerted by the atmosphere at a given point. The term "**barometric pressure**" refers to the actual pressure sensor value. The sensor value may be an altimeter setting, station pressure, or simply a direct pressure value without applied corrections depending on the type of sensor.

Atmospheric Pressure Parameter Definitions and Criteria

Station pressure

The atmospheric pressure at the designated station elevation.

Altimeter setting

The pressure value to which an aircraft altimeter scale is set so that it will indicate the altitude above mean sea level of an aircraft on the ground at the location for which the value was determined.

Sea-level pressure

A pressure value obtained by the theoretical reduction of barometric pressure to sea level. Where the Earth's surface is above sea level, it is assumed that the atmosphere extends to sea level below the station and that the properties of that hypothetical atmosphere are related to conditions observed at the station.

Atmospheric Pressure Observing Standards

Pressure Observing Standards

- **Barometer Comparisons**. Each agency shall establish an agency standard barometer traceable to the standard of the National Institute of Standards and Technology. Each agency shall also establish a system of routine barometer comparisons to determine corrections required to keep the station's pressure sensors within the required accuracy. See Table A-20.

Table A-20. Units of Measure, Range, Accuracy and Resolution of Pressure Parameters

Parameter	Units of Measure	Range	Accuracy	Resolution
Station Pressure	Inches of Mercury	4	+ or - 0.02	0.005 inch
Altimeter Setting	Inches of Mercury	4	+ or - 0.02	0.01 inch
Sea Level Pressure	Hectopascals	136	+ or - 0.68	0.1 hectopascal

- **Atmospheric Pressure**. The various pressure parameters shall be determined from the barometric pressure after appropriate corrections are applied. The method used shall depend on the type of sensor and the available computational aids. These aids may be systems that result in a direct readout of the desired parameter, pressure reduction calculators, or tables. Designated stations may use constants to convert measured pressure to the desired pressure parameter.

- **Station Pressure**. Station pressure shall be determined by adjusting the corrected barometric pressure to compensate for the difference between the height of the barometer and the designated station elevation.

- **Sea-Level Pressure**. At designated stations, sea-level pressure shall be computed by adjusting the station pressure to compensate for the difference between the station elevation and sea level. This adjustment shall be based on the station elevation and the 12-hour mean temperature at the station. The 12-hour mean temperature shall be the average of the present ambient temperature and the ambient temperature 12 hours ago.

  Stations within ±50 feet of sea level may be authorized by their agency to use a constant value to adjust station pressure to sea-level pressure. Otherwise, stations shall use reduction ratios provided by their responsible agency to calculate sea-level pressure.

- **Altimeter setting**. The altimeter setting shall be determined either directly from an altimeter setting indicator or computed from the station pressure by applying a correction for the difference between the station elevation and field elevation in the standard atmosphere. Where this difference is 30 feet or less, agencies may authorize the use of a constant correction.

- **Pressure Change (Rising/Falling)**. At designated stations, the pressure calculated for each report shall be examined to determine if a pressure change is occurring. If the pressure is rising or falling at a rate of at least 0.06 inch per hour and the pressure change totals 0.02 inch or more at the time of the observation, a pressure change remark shall be reported.

- **Pressure Tendency**. Designated stations shall include pressure tendency data in each 3- and 6-hourly report. The pressure tendency includes two parts: the characteristic (an indication of how the pressure has been changing over the past three hours) and the amount of the pressure change in the past three hours. The characteristic shall be based on the observed or recorded (barogram trace) changes in pressure over the past three hours. The amount of pressure change is the absolute value of the change in station pressure or altimeter setting in the past three hours converted to tenths of hectopascals.

 **Atmospheric Pressure Reporting Standards**

- **Rounding Pressure Values**. When computations of pressure values require that a number be rounded to comply with standards on reportable values, the number shall be rounded down to the next reportable value. For example, an altimeter reading of 29.248 inches becomes 29.24 and a station pressure reading of 29.249 inches becomes 29.245.

- **Units of Measure**. Table A-21 lists the units of measure for pressure parameters.

Table A-21. Units of Measure of Pressure Parameters	
Parameter	
Altimeter Setting	Inches of Mercury
Sea-Level Pressure	Hectopascals
Station Pressure	Inches of Mercury

- **Altimeter Setting**. Altimeter setting shall be reported in all reports.

- **Sea-Level Pressure**. At designated stations, sea-level pressure shall be included in the remarks section of all **METAR**s.

- **Remarks**. At designated stations, the pressure change remarks (**PRESRR** or **PRESFR**) shall be reported if occurring at the time of observation. The pressure tendency group shall only be included in 3- and 6-hourly reports.

Summary of Atmospheric Pressure Observing and Reporting Standards

Table A-22. Summary of Pressure Observing and Reporting Standards	
Altimeter Setting	**Reporting Standard**
Altimeter Setting	Reported in inches of mercury at all stations
Sea-level Pressure	Reported in hectopascals at designated stations
Remarks: Rising Rapidly Falling Rapidly	Reported at designated stations
Pressure Tendency	Reported at designated stations

Coding of Atmospheric Pressure Groups

Coding the Altimeter Setting Group ($AP_nP_n\ P_nP_n$)

The altimeter group always starts with an **A** (the international indicator for altimeter in inches of mercury). The altimeter shall be coded as a four digit group immediately following the **A** using the tens, units, tenths, and hundredths of inches of mercury. The decimal point is not coded.

Note: The WMO standard is to report the altimeter in whole hectopascals. In this case, the altimeter setting group will be begin with a **Q** instead of an **A**.

Coding the Sea-level Pressure Group (SLPppp)

The sea-level pressure group (**SLPppp**) is included in the remarks secion of the message. Only the tens, units and tenths of hectopascals is included prefixed with **SLP**. A sea-level pressure of 1002.5 hectopascals would be encoded as: **SLP025**.

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