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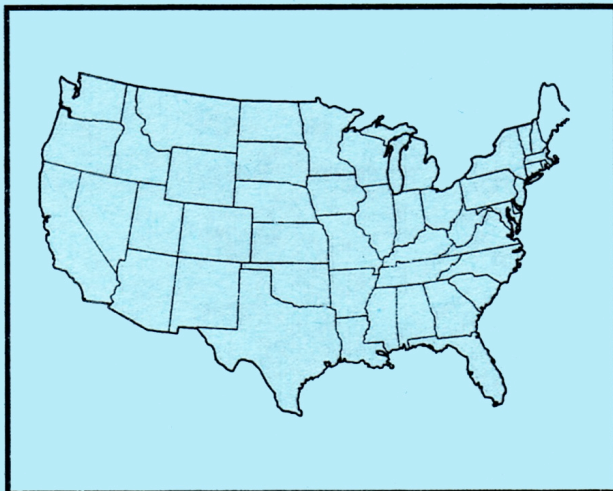
# **The METAR & TAF Quick Reference Manual**

**Highly  
Detailed**

**Comprehensive  
Glossary**

**Abundant  
Examples**

**Contractions  
Translators**



# **METAR & TAF**

## **QUICK REFERENCE MANUAL**

by

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“The writer does the most  
who gives his reader the most knowledge,  
and takes from him the least time.”

-Sydney Smith (1771-1845)

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# Introduction

## **METAR: Routine Weather Report TAF: Routine Aviation Terminal Forecast**

This convenient cockpit companion is designed to give you the most accurate and complete information available on weather reporting and forecasting formats.

An initial review of this manual provides a good overview of the METAR and TAF. And after you have developed a basic familiarity with the METAR and TAF, you will find this guide helpful by saving you time in looking up those items you have not committed to memory.

Section one offers a means to rapidly translate the METAR code so you can clearly understand this report. As you read a METAR and come upon an abbreviation you cannot interpret, you will easily determine its meaning by using the quick reference index.

Over time, you may not need to refer to this guide as often as you once did. You will become skilled in reading the METAR and TAF. But with the changing weather seasons you will, once again, appreciate having this resource to reacquaint yourself with those terms you have not seen in a METAR or TAF for six months, or so.

In section two, the TAF is examined in detail. The TAF is a concise statement of meteorological conditions expected at an airport during a specified period, usually 24 hours. The TAF uses the same weather code as METAR weather reports.

### **Explanatory note of the list of METAR abbreviations on the following pages:**

These abbreviations are located at the front of this manual because you will be referring to this list frequently as you decipher METAR and TAF elements. The abbreviations defined by quotation marks are examples of how an element is spoken. The numerical values are an arbitrary choice in creating the example. Simply substitute the numbers contained in the METAR/TAF element you are translating and use the same words contained in the example.

Following each definition, page references are listed where you may find additional information or an example of that particular abbreviation used in a METAR or TAF. Page references preceded with an abbreviation contained in parenthesis refer to that specific letter(s) of the complete abbreviation listed in the left column.

# List of METAR Abbreviations

<b>\$</b>	indicates maintenance needed on ASOS system, 44
<b>-</b>	light intensity, 25
<b>+</b>	heavy intensity, 25
<b>/</b>	indicator that visual data follows;
<b>/</b>	separator between temperature and dew point data, 14, 32
<b>0000KT</b>	calm wind [wind speed less than one knot], 19, 51
<b>A2985</b>	"altimeter two niner eight five", 34
<b>ACC</b>	altocumulus castellanus, 30, 42
<b>ACFT MSHP</b>	aircraft mishap, 16, 42
<b>ACSL</b>	altocumulus standing lenticular cloud, 30, 42
<b>AO1</b>	automated station without precipitation discriminator, 18, 37
<b>AO2</b>	automated station with precipitation discriminator, 18, 37
<b>ALP</b>	airport location point, 39
<b>AMD</b>	TAF AMD - Amended forecast, 48
<b>APRNT</b>	apparent
<b>APRX</b>	approximately
<b>ASOS</b>	automated surface observing system
<b>AUTO</b>	fully automated report, no human backup, 8
<b>B</b>	began, 39, 40
<b>BC</b>	patches [spoken as "patchy", a descriptor], 25
<b>BCFG</b>	patchy fog [patches of fog], 25
<b>BECMG</b>	"a gradual change" [in forecast conditions, see page 54, 55 for a complete explanation]
<b>BKN</b>	broken [5/8 to 7/8 sky cover], 29, 31
<b>BKN000</b>	between 5/8 to 7/8 of the sky is obscured [spoken as "broken clouds less than five zero"] 10, 28, 41
<b>BKN030</b>	"ceiling three thousand broken", 29, 31
<b>BKN040CB</b>	"ceiling four thousand broken, cumulonimbus", 29, 30
<b>BKN050TCU</b>	"ceiling five thousand broken, towering cumulus", 29, 30
<b>BKN030 V OVC</b>	"broken layer at three thousand variable to overcast", (V) 31, 41
<b>BL</b>	blowing [a descriptor], 25, 27
<b>BLDU</b>	blowing dust, 25
<b>BLPY</b>	blowing spray, 25
<b>BLSA</b>	blowing sand, 25
<b>BLSN</b>	blowing snow, 25, 27
<b>BR</b>	mist [visibility 5/8SM to 6SM], 10, 25, 27
<b>BR HZ</b>	mist haze [visibility is 5/8 SM or more], 9, 10, 25, 27
<b>C</b>	center [referring to runway designation]
<b>CA</b>	cloud to air lightning, 38, 39
<b>CAVOK</b>	ceiling and visibility OK [not used in U.S.]
<b>CB</b>	cumulonimbus cloud, 29-30, 42, 52
<b>CBMAM</b>	cumulonimbus mammatus cloud, 30, 42
<b>CB S MOV E</b>	"cumulonimbus South moving East", 29, 30, 42

# List of METAR Abbreviations

<b>CC</b>	cloud to cloud lightning, 38, 39
<b>CCSL</b>	cirrocumulus standing lenticular cloud, 30, 42
<b>CCSL OVR MT E</b>	"standing lenticular cirrocumulus over the mountain[s] East", 30, 42
<b>CG</b>	cloud to ground lightning, 38, 39
<b>CHI</b>	cloud height indicator
<b>CHINO</b>	sky condition at secondary location not available, 43, 44
<b>CIG</b>	ceiling, 8, 29
<b>CIG 004V008</b>	"ceiling variable between four hundred and eight hundred", 8, 29
<b>CIG 010 RY20</b>	"ceiling one thousand at runway two zero", 38
<b>CLR</b>	clear [0 or 0 below 12,000 feet sky cover], 29
<b>CONS</b>	continuous [lightning-more than 6 flashes/minute], 38, 39
<b>COR</b>	correction to a previously disseminated observation/forecast, 18, 48
<b>DR</b>	low drifting [a descriptor], 10, 25
<b>DRDU</b>	low drifting dust less than 6 ft high, 10, 25
<b>DRSA</b>	low drifting sand less than 6 ft high, 10, 25
<b>DRSN</b>	low drifting snow less than 6 ft high, 10, 25
<b>DS</b>	duststorm, 25
<b>DSIPTG</b>	dissipating
<b>DSNT</b>	distant, 36
<b>DU</b>	widespread dust, 13, 25
<b>DVR</b>	dispatch visual range
<b>DZ</b>	drizzle, 8, 25, 27
<b>DZB</b>	drizzle began, (B) 39, 40
<b>DZE</b>	drizzle ended, (E) 39, 40
<b>E</b>	East or ended, 39, 40
<b>FC</b>	funnel cloud, 9, 25, 37
<b>+FC</b>	tornado or waterspout, 13, 25, 37
<b>FEW</b>	few clouds [ $> 0$ but $\leq 2/8$ sky cover], 9, 29
<b>FEW000</b>	from 0 to 2/8 of the sky is obscured [spoken as "few clouds less than five zero"] 10, 28, 41
<b>FEW040</b>	"few clouds at four thousand", 29
<b>FEW050CB</b>	"few clouds at five thousand, cumulonimbus", (CB) 29, 30
<b>FEW060TCU</b>	"few clouds at six thousand. towering cumulus", (TCU) 29, 30
<b>FG</b>	fog [visibility less than 5/8 statute mile], 9, 25, 29
<b>FG BKN000</b>	"fog obscuring five to seven-eighths of the sky", 28
<b>FG FEW000</b>	"fog obscuring zero to two-eighths of the sky", 28
<b>FG SCT000</b>	"fog obscuring three to four-eighths of the sky", 28
<b>FIBI</b>	filed but impractical to transmit
<b>FM</b>	"after" - [a rapid change in forecast conditions see page 54 for a complete explanation]
<b>FRQ</b>	frequent [lightning-about 1 to 6 flashes/minute], 38, 39

# List of METAR Abbreviations

<b>FROPA</b>	frontal passage, 20, 37, 38
<b>FT</b>	feet
<b>FU</b>	smoke, 12, 25
<b>FU SCT010</b>	"scattered layer of smoke aloft at one thousand", 25, 41
<b>FZ</b>	freezing [a descriptor], 25
<b>FZDZ</b>	freezing drizzle, 9, 25, 27
<b>FZDZB</b>	freezing drizzle began, 25, (B) 39, 40
<b>FZDZE</b>	freezing drizzle ended, 25, (E) 39, 40
<b>FZFG</b>	freezing fog [ice fog], 9, 25
<b>FZRA</b>	freezing rain, 9, 25
<b>FZRAB</b>	freezing rain began, 25, (B) 39, 40
<b>FZRAE</b>	freezing rain ended, 25, (E) 39, 40
<b>FZRANO</b>	freezing rain sensor not available, 43
<b>G</b>	gust, 9, 19, 50, 51
<b>GR</b>	hail, 9, 25, 40
<b>GRB</b>	hail began, (B) 39, 40
<b>GRE</b>	hail ended, (E) 39, 40
<b>GR 1 1/2</b>	"hailstones one and one-half inches in diameter", 40
<b>GS</b>	small hail and/or snow pellets, 12, 25, 40
<b>GSB</b>	small hail or snow pellets began, (B) 39, 40
<b>GSE</b>	small hail or snow pellets ended, (E) 39, 40
<b>HLSTO</b>	hailstone
<b>HZ</b>	haze, 9, 25, 27
<b>IC</b>	ice crystals or in-cloud lightning, 10, 38, 39
<b>INCRG</b>	increasing
<b>INTMT</b>	intermittent
<b>KT</b>	knot[s], 19, 50, 51
<b>L</b>	left [referring to runway designation]
<b>LTG</b>	lightning, 38, 39
<b>LWR</b>	lower
<b>M</b>	minus, less than, 23, 24, 32
<b>M1/4SM</b>	"visibility less than one quarter", 22
<b>M10/M12</b>	"temperature minus one zero, dew point dew point minus one two", 32
<b>M15/</b>	"temperature minus one five, dew point missing", 32
<b>M1000FT</b>	"R-V-R less than one thousand", 23
<b>max</b>	maximum
<b>METAR</b>	routine weather report provided at fixed intervals, 14-16
<b>MI</b>	shallow [a descriptor], 11, 25
<b>MIFG</b>	shallow fog, 12, 27
<b>min</b>	minimum
<b>MOV</b>	moved/moving/movement, 40
<b>MT</b>	mountains

# List of METAR Abbreviations

<b>N</b>	North
<b>N/A</b>	not applicable
<b>NCDC</b>	National Climatic Data Center
<b>NE</b>	Northeast
<b>NIL</b>	part-time TAF not issued yet, See 49 for a complete explanation
<b>NIL AMD SKED AFT [closing time]Z</b>	appears at end of part-time TAF, See page 49 for a complete explanation
<b>NOSPECI</b>	no SPECI reports are taken at this station, 43
<b>NSW</b>	no significant weather [be sure to read about this!], 45, 51
<b>NW</b>	Northwest
<b>00000KT</b>	"wind calm", 19, 50, 51
<b>OCNL</b>	occasional [lightning-less than 1 flash/minute], 38, 39
<b>OHD</b>	overhead, 30, 40
<b>OVC</b>	overcast [8/8 sky cover], 10, 29, 31
<b>OVC008</b>	"ceiling eight hundred overcast", 29, 31
<b>OVC020CB</b>	"ceiling two thousand overcast, cumulonimbus", (CB) 29, 30
<b>OVC010TCU</b>	"ceiling one thousand overcast, towering cumulus", (TCU) 29, 30
<b>P</b>	"more than" indicated greater than the highest reportable value, 23, 24
<b>P6SM</b>	"visibility more than six" [statute miles], 51
<b>P6000FT</b>	"more than six thousand feet" [RVR], 23, 24
<b>PCPN</b>	precipitation
<b>PK WND</b>	peak wind, 11, 20
<b>PK WND 27050/25</b>	"peak wind two seven zero at five zero occurred at two five past the hour", 20
<b>PK WND 32045/1735</b>	"peak wind three two zero at four five occurred at one seven three five", 20
<b>PL</b>	ice pellets, 10, 25
<b>PLB</b>	ice pellets began, (B) 39, 40
<b>PLE</b>	ice pellets ended, (E) 39, 40
<b>PNO</b>	precipitation amount not available, 43
<b>PO</b>	dust/sand whirls [dust devils], 25
<b>PR</b>	partial [a descriptor], 10, 25
<b>PRFG</b>	partial fog, 10, 25
<b>PRES</b>	pressure
<b>PRESFR</b>	pressure falling rapidly, 11, 34, 42
<b>PRESRR</b>	pressure rising rapidly, 11, 34, 42
<b>PROB30</b>	"slight chance" [10% to 29% probability], 53
<b>PROB40</b>	"chance" [30% to 50% probability, see page 53 for a full explanation]
<b>PWINO</b>	precipitation identifier sensor not available, 43
<b>PY</b>	spray, 12, 25
<b>R</b>	right [referring to runway designation]
<b>RA</b>	rain, 25, 26, 27
<b>+RA</b>	heavy rain, 26, 27



# List of METAR Abbreviations

<b>-RA</b>	light rain, 25, 26, 27
<b>RAB</b>	rain began, (B) 39, 40
<b>RAE</b>	rain ended, (E) 39, 40
<b>RA FG</b>	rain, fog, (RA FG) 25, 27, (FG) 9
<b>RAPL</b>	rain, ice pellets, 10, 25
<b>RASNDZ</b>	rain, snow, drizzle, 25, 26, 27
<b>RTD</b>	Routine Delayed [late] forecast, 48
<b>RV</b>	reportable value
<b>RVR</b>	Runway Visual Range, 11, 23, 24
<b>RVRNO</b>	RVR system values not available, 23, 43
<b>RY</b>	runway
<b>S</b>	South
<b>SA</b>	sand, 11, 25
<b>SCSL</b>	stratocumulus standing lenticular cloud, 12
<b>SCT</b>	scattered [3/8 to 4/8 sky cover], 11, 29, 30
<b>SCT000</b>	between 3/8 & 4/8 of the sky is obscured [spoken as "scattered clouds less than five zero"], 10, 28, 41
<b>SCT V BKN</b>	"scattered layer variable to broken", 41
<b>SCT010 V BKN</b>	"scattered layer at one thousand variable to broken", (V) 31, 41
<b>SCT035</b>	"three thousand five hundred scattered", 11, 29, 30
<b>SE</b>	Southeast
<b>SFC</b>	surface
<b>SFC VIS 1</b>	"surface visibility one", 21, 38
<b>SG</b>	snow grains, 12, 25
<b>SGB</b>	snow grains began, (B) 39, 40
<b>SGE</b>	snow grains ended, (E) 39, 40
<b>SH</b>	shower[s][a descriptor], 12, 25
<b>SHGR</b>	hail showers, (SH) 12, 15, (GR) 9
<b>SHGS</b>	small hail shower or snow pellet showers, (SH) 12, 25, (GS) 12
<b>SHPL</b>	ice pellet showers, (SH) 12, 25, (PE) 10
<b>SHRA</b>	rain showers, (SH) 12, 25, (RA) 25, 26
<b>SHSN</b>	snow showers, (SH) 12, 25, (SN) 12, 25
<b>SKC</b>	sky clear [reported by manual stations], 29
<b>SLP</b>	sea-level pressure, 11, 34, 42
<b>SLP142</b>	"sea-level pressure one zero one four point two hectopascals", (SLP) 11, 34
<b>SLPNO</b>	sea-level pressure not available, 34, 42
<b>SM</b>	statute miles, 21, 51
<b>SN</b>	snow, 12, 25, 27
<b>+SN</b>	heavy snow, 12, 25, 27
<b>-SN</b>	light snow, 12, 25, 27
<b>SNB</b>	snow began, (B) 39,40
<b>SNE</b>	snow ended, (E) 39, 40

# List of METAR Abbreviations

<b>SNGS</b>	snow, snow pellets (SN) 12, 25, (GS) 12, 40
<b>SNINCR</b>	snow increasing rapidly, 25
<b>SPECI</b>	an unscheduled weather report when certain criteria have been met, 15, 16, 22, 24, 31
<b>SQ</b>	squall[s], 12, 25, 26
<b>SS</b>	sandstorm, 11, 25
<b>STN</b>	station
<b>SW</b>	Southwest
<b>TAF</b>	Routine Aviation Terminal Forecast, 45, 47, 48
<b>TCU</b>	towering cumulus, 29, 30, 42
<b>TCU OHD</b>	"towering cumulus overhead", 29, 30, 42
<b>TEMPO</b>	an "occasional" condition in a forecast [see page 55 for a complete explanation}
<b>TS</b>	thunderstorm [implies showery precipitation, if occurring, a descriptor]12, 25, 26, 27
<b>TSB</b>	thunderstorm began, (TS) 12, 25, 26, 27, (B) 39, 40
<b>TSE</b>	thunderstorm ended, (TS) 12, 25, 26, 27, (E) 39, 40
<b>TSGR</b>	thunderstorm, hail, (TS) 12, 25, 26, 27, (GR) 9, 25, 40
<b>TSGS</b>	thunderstorm, small hail/ice pellets, (TS) 12, 25, 26, 27, (GS) 12, 25, 40
<b>TSNO</b>	thunderstorm information not available, 43
<b>TSPL</b>	thunderstorm, ice pellets, (TS) 12, 25, 26, 27, (PE) 10, 25
<b>TSRA</b>	thunderstorm, rain, (TS) 12, 25, 26, 27, (RA) 25, 26, 27
<b>TSSN</b>	thunderstorm, snow, (TS) 12, 25, 26, 27, (SN) 25, 26, 27
<b>TWR</b>	tower
<b>TWR VIS 2</b>	"tower visibility two", 21, 38
<b>UNKN</b>	unknown
<b>UP</b>	unknown precipitation, 13, 25, 26, 51
<b>UPB</b>	unknown precipitation began, (B) 39,40
<b>UPE</b>	unknown precipitation ended, (E) 39, 40
<b>UTC</b>	Coordinated Universal Time, 18, 49
<b>V</b>	variable, 19, 24, 31, 38, 41
<b>VA</b>	volcanic ash, 25, 37
<b>VC</b>	in the vicinity, 13
<b>VCBLDU</b>	blowing dust in the vicinity, (VC) 13, (BLDU) 8, 25
<b>VCBLSA</b>	blowing sand in the vicinity,(VC) 13, (BLSA) 8, 25
<b>VCBLSN</b>	blowing snow in the vicinity, (VC) 13, (BLSN) 8, 25, 27
<b>VCDS</b>	duststorm in the vicinity, (VC) 13, (DS) 25
<b>VCFC</b>	funnel cloud in the vicinity, (VC) 13, (FC) 9, 25
<b>VCFG</b>	fog in the vicinity, (VC) 13, (FG) 9, 25
<b>VCPO</b>	dust devils in the vicinity, (VC) 13, (PO) 25
<b>VCSH</b>	showers in the vicinity, (VCSH) 13, (SH) 12, 25, 26, 27
<b>VCSS</b>	sandstorm in the vicinity, (VC) 13, (SS) 11, 25
<b>VCTS</b>	thunderstorms in the vicinity, (VC) 13, (TS) 12, 25, 26, 27, 40

# List of METAR Abbreviations

<b>VIRGA</b>	precipitation that is observed but not reaching the ground, 13, 41
<b>VIS</b>	visibility, 21, 22, 38
<b>VIS2V3</b>	"visibility variable between two and three", 21, 38
<b>VIS E 2</b>	"visibility East two", 22, 38
<b>VIS N 1</b>	"visibility North one", 22, 38
<b>VIS S 3</b>	"visibility South three", 22, 38
<b>VIS W 4</b>	"visibility West four", 22, 38
<b>VISNO</b>	visibility at secondary location not available, 43, 44
<b>VIS 1 RY22</b>	"visibility one, at Runway two two", 22, 38
<b>VR</b>	visual range
<b>VRB</b>	variable, 13,20, 21, 50, 51
<b>VRB03KT</b>	"wind variable at three", 20
<b>VV</b>	indefinite ceiling [vertical visibility], 29, 52
<b>VV003</b>	"indefinite ceiling 300" [vertical visibility 300 feet], 29, 52
<b>VV///</b>	indefinite ceiling height not available
<b>W</b>	West
<b>WS</b>	windshear, 52
<b>WS020/17040KT</b>	"low level wind shear at two thousand, wind one seven zero at four zero", 52
<b>WND</b>	wind, 19, 20
<b>WSHFT</b>	windshift, 13, 20, 37, 38
<b>WSHFT 35</b>	"windshift at three five", 13, 20, 37, 38
<b>WSHFT 20 FROPA</b>	"windshift at two zero due to frontal passage", 13, 20, 37, 38
<b>Z</b>	zulu [Coordinated Universal Time or UTC], 18

# Glossary of Common METAR Terms

**augmented report.** A meteorological report prepared by an automated surface weather observing system for transmission with certified weather observers signed on to the system to add information to the report.

**automated report.** A meteorological report prepared by an automated surface weather observing system for transmission, and with no certified weather observers signed on to the system.

**blowing (BL).** A descriptor used to amplify observed weather phenomena whenever the phenomena are raised to a height of 6 feet or more above the ground.

**blowing dust (BLDU).** Dust picked up locally from the surface of the earth and blown about in clouds or sheets, reducing the horizontal visibility to less than 7 statute miles.

**blowing sand (BLSA).** Sand particles picked up from the surface of the earth by the wind to moderate heights above the ground, reducing the reported horizontal visibility to less than 7 statute miles.

**blowing snow (BLSN).** Snow lifted from the surface of the earth by the wind to a height of 6 feet or more above the ground and blown about in such quantities that horizontal visibility is restricted at and above that height.

**blowing spray (BLPY).** Water droplets torn by the wind from a body of water, generally from the crests of waves, and carried up into the air in such quantities that they reduce the reported horizontal visibility to less than 7 statute miles.

**broken (BKN) layer.** A cloud layer covering whose summation amount of sky cover is 5/8ths through 7/8ths.

**ceiling (CIG).** The height above the earth's surface (field elevation or ground elevation) of the lowest non-surface based layer that is reported as broken or overcast, or the vertical visibility into an indefinite ceiling.

**clear sky (SKC).** The state of the sky when it is cloudless.

**dew point.** The temperature to which a given parcel of air must be cooled at constant pressure and constant water-vapor content for saturation to occur.

**drizzle (DZ).** Fairly uniform precipitation composed exclusively of fine drops very close together. Drizzle appears to float while following air currents, although unlike fog droplets, it falls to the ground.

# Glossary

**dust (DU).** see widespread dust.

**few (FEW).** A layer whose summation amount of sky cover is greater than zero but less than 2/8ths.

**fog (FG).** A visible aggregate of minute water particles (droplets) which are based at the Earth's surface and reduces horizontal visibility to less than 5/8 statute mile and, unlike drizzle, it does not fall to the ground.

**freezing (FZ).** A descriptor, FZ, used to describe drizzle and/or rain that freezes on contact with the ground or exposed objects, and used also to describe fog that is composed of minute ice crystals.

**freezing drizzle (FZDZ).** Drizzle that freezes upon contact with the ground, or other exposed objects.

**freezing fog (FZFG).** A suspension of numerous minute ice crystals in the air, or water droplets at temperatures below zero degrees Celsius, based at the earth's surface, which reduces horizontal visibility; also called ice fog.

**freezing precipitation.** Any form of precipitation that freezes upon impact and forms a glaze on the ground or exposed objects.

**freezing rain (FZRA).** Rain that freezes upon impact and forms a glaze on the ground or exposed objects.

**frozen precipitation.** Any form of precipitation that reaches the ground in solid form (snow, small hail and/or snow pellets, snow grains, hail, ice pellets, and ice crystals.

**funnel cloud (FC).** A violent, rotating column of air which does not touch the ground, usually appended to a cumulonimbus cloud.

**gust (G).** Rapid fluctuations in wind speed with a variation of 10 knots or more between peaks and lulls.

**hail (GR).** Precipitation in the form of small balls or other pieces of ice falling separately or frozen together in irregular lumps.

**haze (HZ).** A suspension in the air of extremely small, dry particles invisible to the naked eye and sufficiently numerous to give the air an opalescent appearance.

**hectopascal.** A unit of measure of atmospheric pressure equal to 100 newtons per square meter.

# Glossary

**ice crystals (IC).** A fall of unbranched (snow crystals are branched) ice crystals in the form of needles, columns, or plates.

**ice fog.** See freezing fog.

**ice pellets (PL).** Precipitation of transparent or translucent pellets of ice, which are round or irregular, rarely conical, and which have a diameter of 0.2 inch (5mm), or less.

**indefinite ceiling (VV).** The ceiling classification applied when the reported ceiling value represents the vertical visibility (VV) upward into surface-based obscuration.

**low drifting (DR).** A descriptor, DR, used to describe snow, sand, or dust raised to a height of less than 6 feet above the ground.

**low drifting dust (DRDU).** Dust that is raised by the wind to less than 6 feet above the ground, visibility is not reduced below 7 statute miles at eye level although objects below this level may be veiled or hidden by the particles moving nearly horizontal to the ground.

**low drifting sand (DRSA).** Sand that is raised by the wind to less than 6 feet above the ground, visibility is not reduced below 7 statute miles at eye level although objects below that level may be veiled or hidden by particles moving nearly horizontal to the ground.

**low drifting snow (DRSN).** Snow that is raised by the wind to less than 6 feet above the ground, visibility is not reduced below 7 statute miles at eye level although objects below that level may be veiled or hidden by particles moving nearly horizontal to the ground.

**mist (BR).** An aggregate of microscopic water droplets or ice crystals suspended in the atmosphere that reduces visibility to less than 6 statute miles but greater than 5/8 statute mile.

**overcast (OVC).** A layer of clouds whose summation amount of sky cover is 8/8ths.

**partial (PR).** A descriptor, PR, used only to report fog that covers part of the airport.

**partial fog (PRFG).** Fog covering part of the station and which extends to at least 6 feet above the ground and apparent visibility in the fog is less than 5/8SM. Visibility over parts of the station are less than or equal to 5/8SM.

**partial obscuration (FEW000, SCT000, BKN000).** The portion of the sky cover (including higher clouds, the moon, or stars) hidden by weather phenomena in contact with the surface.

**patches (BC).** A descriptor, BC, used only to report fog that occurs in patches at the airport. Spoken as "patchy".

# Glossary

**patchy fog (BCFG).** Fog covering part of the station and which extends to at least 6 feet above the ground and the apparent visibility in the fog patch or bank is less than 5/8SM. Visibility in parts of the observing area is greater than or equal to 5/8SM. When the fog is close to the point of observation, the minimum visibility reported will be less than 5/8SM.

**peak wind speed (PK WND).** The maximum instantaneous wind speed since the last METAR that exceeded 25 knots.

**pressure falling rapidly (PRESFR).** A decrease in station pressure at a rate of 0.06 inch of mercury or more per hour which totals 0.02 inch or more.

**pressure rising rapidly (PRESRR).** An increase in station pressure at a rate of 0.06 inch of mercury or more per hour which totals 0.02 inch or more.

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

**rotor cloud.** A turbulent cloud formation found in the lee of some large mountain barriers. The air in the cloud rotates around an axis parallel to the mountain range.

**Runway Visual Range (RVR).** An instrumentally-derived value, based on standard calibrations, that represents the horizontal distance a pilot may see down the runway from the approach end.

**sand (SA).** Loose particles of granular material.

**sandstorm (SS).** Particles of sand that are carried aloft by a strong wind. The sand particles are mostly confined to the lowest ten feet, and rarely rise more than fifty feet above the ground.

**scattered (SCT).** A layer whose summation amount of sky cover is 3/8ths through 4/8ths.

**sea-level pressure (SLP).** The pressure value obtained by the theoretical reduction or increase of barometric pressure to sea-level.

**sector visibility.** The visibility in a specified direction that represents at least a 45 degree arc of the horizon circle.

**shallow (MI).** A descriptor, MI, used only to describe fog when the visibility at 6 feet above the ground is 5/8ths statute mile or more and the apparent visibility in the fog layer is less than 5/8ths statute mile.

# Glossary

**shallow fog (MIFG).** Fog in which the visibility at 6 feet above ground level is 5/8ths statute mile or more and the apparent visibility in the fog layer is less than 5/8ths statute mile.

**shower(s) (SH).** A descriptor, SH, used to qualify precipitation characterized by the suddenness with which it starts and stops, by the rapid changes of intensity, and usually by rapid changes in the appearance of the sky.

**small hail (GS).** See snow pellets.

**smoke (FU).** A suspension in the air of small particles produced by combustion.

**snow (S).** Precipitation of snow crystals, mostly branched in the form of six-pointed stars; for automated stations, any form of frozen precipitation other than hail.

**snow grains (SG).** Precipitation of very small, white, opaque grains of ice; the solid equivalent of drizzle.

**snow pellets (GS).** Precipitation of white, opaque grains of ice. The grains are round or sometimes conical.

**spray (PY).** An ensemble of water droplets torn by the wind from an extensive body of water, generally from the crests of waves, and carried up into the air in such quantities that it reduces horizontal visibility.

**squall (SQ).** A strong wind characterized by a sudden onset in which wind speeds increase to at least 16 knots and are sustained at 22 knots or more for at least one minute.

**standing lenticular cloud (SCSL, ACSL, CCSL).** A, more or less, isolated cloud with sharp outlines that is generally in the form of a smooth lens or almond. These clouds often form on the lee side of and generally parallel to mountain ranges, and are indicative of turbulence aloft. Depending on their height above the surface, they may be reported as stratocumulus standing lenticular cloud (SCSL); altocumulus standing lenticular cloud (ACSL); or cirrocumulus standing lenticular cloud (CCSL).

**summation amount.** The sky cover for a given layer of clouds that is the sum of the sky cover of all lower cloud layers plus the layer evaluated, all added together.

**thunderstorm (TS).** A descriptor, TS, used to qualify precipitation produced by cumulonimbus cloud that is accompanied by lightning and thunder, or for automated systems, a storm detected by lightning detection systems.



# Glossary

**tornado (+FC).** A violent, rotating column of air touching the ground; funnel cloud that touches the ground (see funnel cloud and water spout).

**unknown precipitation (UP).** Precipitation type that is reported if the automated station detects the occurrence of light precipitation but the precipitation discriminator cannot recognize the type.

**variable ceiling.** A ceiling of less than 3,000 feet which rapidly increases or decreases in height by established criteria during the period of observation.

**variable prevailing visibility.** A condition when the prevailing visibility is less than 3 statute miles and rapidly increases and decreases by 1/2 statute mile during the period of the observation.

**variable wind direction.** A condition when (1) the wind direction fluctuates by 60 degrees or more during the 2-minute evaluation period and the wind speed is greater than 6 knots; or (2) the direction is variable and the wind speed is 6 knots or less.

**vertical visibility (VV).** A subjective or instrumental evaluation of the vertical distance into a surface based obscuration that an observer would be able to see.

**vicinity (VC).** A proximity qualifier, VC, used to indicate weather phenomena observed between 5 and 10 statute miles of the usual point of observation but not at the station.

**virga.** Visible wisps or strands of precipitation falling from clouds that evaporate before reaching the surface.

**waterspout (+FC).** A violent, rotating column of air that forms over a body of water, and touches the water surface; tornado or funnel cloud that touches a body of water (see funnel cloud and tornado).

**widespread dust.** Fine particles of earth or other matter raised or suspended in the air by the wind that may have occurred at or far away from the station.

**wind direction.** The true direction from which the wind is moving at a given location.

**wind shift (WSHFT).** A change in the wind direction of 45 degrees or more in less than 15 minutes with sustained wind speeds of 10 knots or more throughout the wind shift.

# METAR Format

The international aviation **routine** reporting code called METAR contains the below elements in the order listed:

1. Type of Report
2. ICAO Station Identifier
3. Date and Time of Report
4. Modifier (as required)
5. Wind
6. Visibility
7. Runway Visual Range (RVR)
8. Weather Phenomena
9. Sky Conditions
10. Temperature/Dew Point Group
11. Altimeter
12. Remarks (RMK)

The above elements are separated with a space with the exception of temperature and dew point which are separated by a solidus ( / ).

When an element does not occur or cannot be observed, the preceding space and that element are omitted from the METAR.

Below is an example of a METAR with explanations:

**METAR KMIA 051350Z 32012KT 3SM MIFG SKC 16/14 A3015 RMK SLP994 T01500119**

<b>METAR</b>	Aviation Routine Weather Report (Type of Report)
<b>KMIA</b>	Miami, FL (ICAO Station Identifier)
<b>051350Z</b>	Date 05, time 1350 UTC (Date and Time of Report)
<b>32012KT</b>	wind three two zero at one two (Wind)
<b>3SM</b>	visibility three (Visibility)
<b>MIFG</b>	shallow fog (Weather Phenomena)
<b>SKC</b>	clear (Sky Conditions)
<b>16/14</b>	temperature 16, dew point 14 (Temp/Dew Point Group)
<b>A3015</b>	altimeter 3015 (Altimeter)
<b>RMK</b>	remarks (Remarks follow)
<b>SLP994</b>	sea level pressure 999.4 hectopascals (remark)
<b>T01500119</b>	temperature 15.0 degrees C, dew point 11.9 degrees C (remark)

# METAR Format

And here is another example of a **routine** METAR with explanations:

**METAR KSEA 141545 33018KT 290V360 1/2SM R31/2600FT +SN BLSN FG  
VV008 00/M03 A2991 RMK RAESNB42 SLPNO T0011032**

<b>METAR</b>	aviation routine weather report
<b>KSEA</b>	Seattle, WA
<b>141545</b>	date 14, time 1545 UTC
<b>33018KT</b>	wind 330 at 18 knots
<b>290V360</b>	wind direction variable between 290 and 360 degrees
<b>1/2SM</b>	visibility one-half
<b>R31/2600FT</b>	runway 31, RVR 2600
<b>+SN</b>	heavy snow
<b>BLSN FG</b>	blowing snow and fog
<b>VV008</b>	indefinite ceiling 800
<b>00/M03</b>	temperature zero, dew point minus 3
<b>A2991</b>	altimeter 2991
<b>RMK</b>	remarks (follow)
<b>RAESNB42</b>	rain ended at four two, snow began at four two
<b>SLPNO</b>	sea-level pressure not available
<b>T0011032</b>	temperature 0.1 degree C, dew point -3.2 degrees C

And finally, an example of an international aviation **non-routine** reporting code called a **SPECI** (special weather report) is shown below with accompanying explanations:

**SPECI KPIT 282134Z 28024G36KT 3/4SM +TSRA SQ BKN008 OVC020CB 28/23  
A3000 RMK TSB24RAB24**

<b>SPECI</b>	non-routine (special) weather report
<b>KPIT</b>	Pittsburgh, PA
<b>282134Z</b>	date 28, time 2134 UTC
<b>28024G36KT</b>	wind 280 at 24 gusts 36
<b>3/4SM</b>	visibility three-quarters
<b>+TSRA SQ</b>	thunderstorm with heavy rain, squalls
<b>BKN008 OVC020CB</b>	ceiling 800 broken, 2,000 overcast, cumulonimbus
<b>28/23</b>	temperature 28 degrees C, dew point 23 degrees C
<b>A3000</b>	altimeter 3000
<b>RMK</b>	remarks (follow)
<b>TSB24RAB24</b>	thunderstorm began at two four, rain began at two four

# Report Type

There are two types of new aviation weather reports:

1. **METAR** - An hourly aviation routine weather report.

A routine **METAR** hourly weather report is observed between 45 minutes after the hour til the hour. It is encoded as a **METAR** report even if it meets **SPECI** criteria.

2. **SPECI** - A non-routine (special) aviation weather report.

A **SPECI** is spoken as, "**SPECIAL REPORT (last two digits of the time) OBSERVATION**".

A **SPECI** is taken when any of the following criteria have been met:

**Wind** - A wind shift.

**Visibility** - Certain changes in visibility which cause the weather to change flight categories (IFR, MVFR, or VFR).

**RVR** - Changes to above or below 2400 feet.

**Tornado, Funnel Cloud, Waterspout** - When observed or disappears from sight (end).

**Thunderstorm** - Begins or ends.

**Precipitation** - If certain types of precipitation begin, end, or change intensity.

**Squalls** - When they occur.

**Ceiling** - Certain changes in ceilings which cause the weather to change flight categories (IFR, MVFR, VFR).

**Sky Condition** - A layer of clouds or obscuring phenomena aloft forms below 1000 feet.

**Volcanic Eruption** - When an eruption is first noted.

**Aircraft Mishap** - Upon notification of an aircraft mishap, unless there has been an intervening observation. The **SPECI** is not transmitted.

**Miscellaneous** - Any other meteorological situation designated by the weather agency, or which, in the opinion of the observer, is critical.

# Location Identifier

METAR weather reports use ICAO four letter station identifiers. Conterminous United States stations are now preceded with a **K**.

Example: Former MIA (Miami, FL) has become **KMIA**

For the conterminous United States, the change of identifiers is really quite simple, just add a **K** to the front of all the identifiers which you are already familiar with.

The station identifiers of weather reporting stations that included numerics have been converted to all letters to accommodate this new designation method. For example, the identifier for Hilton Head, SC was formerly 49J. It was changed to HXD prior to implementing METAR, and is now **KHXD**.

Location identifiers outside of the conterminous United States are a little different:

Alaskan stations begin with **PA**.

Example: Former ANC (Anchorage, AK) has become **PANC**

Hawaiian stations begin with **PH**.

Example: Former HNL (Honolulu, HI) has become **PHNL**

For stations outside of the conterminous United States, the **last two letters** actually reflect the reporting station identifier.

Notice that the former Anchorage, AK (ANC) identifier began with an **A**. In this case, only the **P** of the **PA** prefix was added to ANC, resulting in **PANC**.

However, the former Nome, AK identifier was OME. Since station identifiers in Alaska begin with **PA** you would think that Nome's identifier would be PAOME. However, **station identifiers are limited to four letters**. To resolve this conflict, the last letter of the previously assigned identifier was dropped and **PA** was added to the original OME, resulting in PAOM: **OME (Nome, AK) has become PAOM**.

Here's an example of this rule in Hawaii:

Hawaiian stations begin with **PH**. The original Keahole, HI identifier was KOA. By adding **PH** to the beginning of the old identifier, and dropping the last letter of the old identifier, **KOA becomes PHKO**.

A complete worldwide listing of station identifiers is contained in *ICAO Document 7910, Location Identifiers*.

# Date and Time

The Date/Time group in a METAR is the time of the weather observation.

Example: **221850Z** - The observation was taken on the 22nd day of the month at 1850 Zulu Time.

The Date/Time group in a METAR has six characters:

The first two characters are the date of the weather observation.

The middle two digits are the hour of the weather observation.

And the last two digits represent the minutes after the hour of the weather observation.

**Z** is placed at the end of this Date/Time group to indicate **Zulu Time** (Coordinated Universal Time).

## Modifier

The modifier element, if used, follows the Date/Time group.

**AUTO** identifies an automated weather report with no human intervention.

If **AUTO** is shown in the body of the report, the type of sensor equipment used at the station will be encoded in the remarks section of the report.

**AO1** - Is for automated weather reporting stations **without** a precipitation type discriminator.

**AO2** - Is for automated weather reporting stations **with** a precipitation type discriminator.

The **absence of AUTO** indicates that the weather report was made manually or that the automated report had human backup.

An automated weather report is introduced verbally with the phraseology, "**(Location name) AUTOMATED WEATHER OBSERVATION.**"

**COR** identifies a corrected weather report that is sent out to replace an earlier weather report with an error.

The time entered for the corrected report is the same time used in the report being corrected.

# Wind

Winds are reported in a five digit group (six digits if wind speed exceeds 99 knots).

The first three digits are the direction **from** which the wind is blowing in **tens of degrees** referenced to **True North**.

Directions less than 100 degrees are preceded with a zero.

The remaining digits are the **average speed**, measured or estimated, in **knots**.

The abbreviation **KT** follows the wind direction and speed to indicate the use of **knots** for reported wind speed but **it is not spoken**.

Wind speed, whether measured or estimated, is determined by averaging the speed over a two minute period.

Estimated wind speed and direction are reported in the same manner as measured winds.

Example: **32009KT "Wind three two zero at niner"**

There is no way to tell the difference between estimated or measured winds. They are reported in the same manner.

If wind speed is less than one knot, it is reported as calm.

Example: **00000KT "Wind calm"**

If the wind is **gusty**, **G** is reported after the speed followed by the **highest** gust reported. Wind gusts are rapid fluctuations in speed with ten knots or more between peaks and lulls within the past ten minutes.

Example: **28031G43KT "Wind two eight zero at three one gusts four three"**

If wind direction is variable by **60 degrees or more** and the speed is **greater than 6 knots**, a **variable** group consisting of the extremes of the wind directions separated by a **V** will follow the wind group.

Example: **21014G25KT 270V360 "Wind two one zero at one four, gusts two five, wind variable between two seven zero and three six zero"**

# Wind

The wind may also be considered **variable** if the wind speed is **6 knots or less** and in the weather observer's opinion the wind is varying in direction (the 60 degree rule does not apply). This is indicated by the contraction **VRB**.

Example: **VRB03KT "Wind variable at three"**

Whenever the peak wind exceeds 25 knots, **PK WND** will be included **in remarks** in the next report. The peak wind remark includes three digits for direction and two or three digits for speed followed by the time in hours and minutes of occurrence. If the hour can be inferred from the report time, only the minutes are reported.

Example: **PK WND 27045/32 "peak wind two seven zero at four five occurred at three two past the hour"**

Example: **PK WND 32050/1354 "peak wind three two zero at five zero occurred at one three five four"**

When a wind shift occurs, **WSHFT** will be included in remarks followed by the time the wind shift **began** (with only minutes reported, if the hour can be inferred from the time of the observation).

Example: **WSHFT 35 "Wind shift at three five"**

The contraction **FROPA** may be entered following the time if the wind shift is the result of a frontal passage.

Example: **WSHFT 24 FROPA "Wind shift at two four due to frontal passage"**

If either the wind direction or speed is **missing**, the wind element is **entirely omitted** from the METAR.



# Visibility

Visibility is reported as a separate element from its associated weather and obscurations.

It is reported in statute miles (SM). SM always follows the reported visibility but it is **not spoken**.

Example: **10SM "Visibility one zero"**

In the visibility element, whole numbers and fractions are separated by a space.

Example: **1 1/2SM "Visibility one and one half"**

## PREVAILING VISIBILITY

Prevailing visibility is the greatest distance that can be seen throughout at least half of the horizon circle, not necessarily continuous.

## VARIABLE VISIBILITY

When the prevailing visibility rapidly increases or decreases by 1/2 statute mile or more, during a weather observation, and the average prevailing visibility is less than three statute miles, the visibility is variable. Variable visibility is shown in remarks with the minimum and maximum visibility values.

There is no indication in the body of the METAR that visibility is variable. However when the criteria exists the minimum and maximum readings will still be placed in remarks preceded by the contraction **VIS**.

Example: **(in the body) 1 1/2SM (remarks) VIS 1V2  
(remarks) spoken as "Visibility variable between one and two"**

When visibilitys are **less than seven miles**, the restriction to visibility will be shown in the weather element. However, if volcanic ash, low drifting dust, sand, or snow are observed, they are always reported even if visibility's are seven miles or greater.

## TOWER OR SURFACE VISIBILITY

If tower or surface visibility is **less than four statute miles**, the **lesser** of the two will be reported in the body of the report; the **greater** will be reported in remarks.

Example:

<u>In the body</u>	<u>In Remarks</u>	<u>Remarks spoken as</u>
<b>1 1/2SM (Surface Visibility)</b>	<b>TWR VIS 2</b>	<b>"Tower visibility two"</b>
<b>2SM (Tower Visibility)</b>	<b>SFC VIS 3</b>	<b>"Surface visibility three"</b>

# Visibility

## **AUTOMATED VISIBILITY**

Automated reporting stations show visibility less than 1/4 statute mile as **M1/4SM** and visibility ten, or greater than ten statute miles as **10SM**

Example: **M1/4SM "Visibility less than one-quarter"**

Example: **10SM "Visibility one zero"**

## **SECOND SITE SENSORS**

For automated reporting stations having more than one visibility sensor, site specific visibility which is **lower** than the visibility shown in the body will be shown in remarks.

Example: **VIS 1 RY22 "Visibility one, at Runway two two"**

## **SECTOR VISIBILITY**

Sector visibility is shown in remarks when it differs from the prevailing and either the prevailing or sector visibility is less than three miles.

Example: **VIS S 1 "Visibility South one"**

## **SPECI CRITERIA**

The below visibility condition requires the issuance of a **SPECI** report:

- visibility in the body of the report decreases to less than, or if below, increases to equal or exceed:

-3 statute miles

-2 statute miles

-1 statute mile

-The lowest standard instrument approach minimum as published. If none is published, use 1/2 statute mile.

# RVR

## (Runway Visual Range)

RVR is reported whenever the prevailing visibility is **one statute mile or less**, and/or the RVR for the designated instrument runway is **6,000 feet or less**.

Manual weather reporting stations report only one RVR, but automated stations can report up to four different locations for the same airport.

In encoding RVR:

The runway and the visual range reading are separated by a solidus (/).

The RVR value is reported in hundreds of feet **with trailing zeros included**.

"**FT**" is added to the end of the RVR element to indicate that the visibility is in feet. "Feet" is not spoken.

Example: **R12L/1200FT**

**"Runway one two left visual range one thousand two hundred"**

-or-

**"Runway one two left R-V-R one thousand two hundred"**

If the RVR value is less than its lowest reportable value, the lowest reportable value encoded is preceded by an "**M**" (minus), spoken as "**less than**".

Example: **R12R/M1000FT**

**"Runway one two right visual range less than one thousand"**

-or-

**"Runway one two right R-V-R less than one thousand"**

If the RVR value is more than its greatest reportable value, the greatest reportable value encoded is preceded by a "**P**" (plus), spoken as "**more than**".

Example: **R12/P6000FT**

**"Runway one two visual range more than six thousand"**

-or-

**"Runway one two R-V-R more than six thousand"**

If RVR should be reported, but is missing, **RVRNO** will be in remarks.

# **RVR**

## **(Runway Visual Range)**

When the RVR varies by more than one reportable value, the lowest and highest values are shown with a V between them.

Example: **R18/1000V2000FT**

**"Runway one eight visual range variable between one thousand and two thousand"**

-or-

**"Runway one eight R-V-R variable between one thousand and two thousand"**

Additional examples of variable RVR readings:

Example: **R17L/M0600V3000FT**

**"Runway one seven left visual range variable from less than six hundred to three thousand"**

-or-

**"Runway one seven left R-V-R variable from less than six hundred to three thousand"**

Example: **R07/4000VP6000FT**

**"Runway seven visual range variable from four thousand to more than six thousand"**

-or-

**"Runway seven R-V-R variable from four thousand to more than six thousand"**

### **SPECI CRITERIA:**

The below RVR condition requires the issuance of a **SPECI** report:

-the highest value from the designated RVR runway decreases to less than, or if below, increases to equal or exceed 2,400 feet during the preceding ten minutes.

# Weather and Obscurations

**Weather phenomena** include the following:

**Precipitation:**

- DZ - Drizzle
- RA - Rain
- SN - Snow
- SG - Snow Grains
- IC - Ice Crystals
- PL - Ice Pellets
- GR - Hail
- GS - Small Hail or Snow Pellets
- UP - Unknown Precipitation (reported by automated stations only)

**Obscurations:**

- BR - Mist
- FG - Fog
- FU - Smoke
- DU - Dust
- SA - Sand
- HZ - Haze
- PY - Spray
- VA - Volcanic Ash

**Other** types of Weather Phenomena:

- PO - Dust or Sand Swirls
- SQ - Squalls
- SS - Sandstorm
- DS - Duststorm
- FC - Funnel Cloud
- +FC - Tornado or Waterspout

**Descriptor** Qualifiers of Weather Phenomena Include the following:

- MI - Shallow
- BC - Patches
- DR - Low Drifting
- BL - Blowing
- SH - Showers
- TS - Thunderstorm
- FZ - Freezing
- PR - Partial

**Intensity** Qualifiers include: **Light**, denoted by - ; **Moderate**, denoted by the **lack of a symbol**; and **Heavy**, denoted by + ; and the **Proximity** Qualifier "**In the Vicinity**" is denoted by **VC**.

# Weather and Obscurations

The preceding weather groups are constructed in the following sequence:

Intensity or proximity are entered first.  
Then a descriptor is entered, if needed.  
Then follows precipitation type or obscuration **in order of predominance**.  
(exception) FC (funnel cloud) will always be first, when reported.

Example: **+SHRA "Heavy rainshowers"**

**Intensity refers to precipitation or certain obscuration types, not the descriptor.**

When more than one type of precipitation is present, the intensity refers to the **first** precipitation type (**most predominant**).

**VC (in the vicinity)** indicates the weather phenomena is not occurring at the station, but rather **within five to ten miles** of the station.

Example: **VCSH "Showers in the vicinity"**

**UP** (unknown precipitation) is used only by automated weather reporting systems to indicate that the system cannot identify the precipitation with any degree of precision.

**SQ** (squall) is a sudden increase in wind speed of at least 16 knots, the speed rising to 22 knots or more and lasting at least one minute.

Example: **32045KT 7SM SQ**  
**"Wind three two zero at four five, visibility seven, squalls"**

When a + (heavy) is placed on front of **TS** (thunderstorm), it is not an indication of a severe thunderstorm. The intensity symbol + relates to the precipitation type **RA** (rain),

Example: **+TSRA "Thunderstorm, heavy rain"**

There is not a METAR criteria for severe thunderstorms.

**The criteria for severe thunderstorms is 50 knot winds and/or 3/4 inch hail.**  
This information is available in a METAR, and this will indicate that a severe thunderstorm is occurring.

# Weather and Obscurations

Intensity of Rain (RA) or Freezing Rain (FZRA) estimates:

Light ( - ) - From scattered drops that, regardless of duration, do not completely wet an exposed surface up to a condition where individual drops are easily seen.

Moderate (no symbol) - Individual drops are not clearly identifiable; spray is observable just above pavements and other hard surfaces.

Heavy ( + ) - Rain seemingly falls in sheets; individual drops are not identifiable; heavy spray to a height of several inches is observed over hard surfaces.

Intensity of Snow (SN) or Drizzle (DZ) estimates:

Light ( - ) - Visibility more than 1/2 mile.

Moderate (no symbol) - Visibility more than 1/4 mile but less than or equal to 1/2 mile.

Heavy ( + ) - Visibility less than or equal to 1/4 mile.

Some examples of Weather Phenomena:

4SM -RASNDZ	"Visibility four, light rain, snow, drizzle"
7SM VCBSN	"Visibility seven, blowing snow in the vicinity"
7SM VCSH	"Visibility seven, showers in the vicinity"
4SM BLSN	"Visibility four, blowing snow"
3SM -TSRA	"Visibility three, thunderstorm, light rain"
10SM TS	"Visibility one zero, thunderstorm"
1SM +TSRA	"Visibility one, thunderstorm, heavy rain"
FZDZ	"Freezing drizzle"
BR HZ	"Mist, haze" (Visibility 5/8 mile or greater)
-RA FG	"Light rain, fog" (Visibility less than 5/8 mile)

**Obscuring phenomena**, when present, along with precipitation, will be in a separate group from precipitation and **entered in order of predominance**.

These **obscuring phenomena** are any phenomena in the atmosphere, other than precipitation, **that reduce horizontal visibility**.

There is no identifier for ground fog, and no descriptor to create ground fog in a METAR. **Ground fog** can best be described as **MIFG (Shallow Fog)**.

# Partial Obscurations

Obscurations are reported when the sky is **partially obscured** by a **ground based** phenomenon by indicating the amount of obscuration as **FEW**, **SCT**, or **BKN** followed by three zeros (**000**).

Example: **FEW000** (**greater than 0 to 2/8 of the sky is obscured**)  
**"Few clouds less than five zero"** (feet)

**SCT000** (**between 3/8 and 4/8 of the sky is obscured**)  
**"Scattered clouds less than five zero"** (feet)

**BKN000** (**between 5/8 and 7/8 of the sky is obscured**)  
**"Broken clouds less than five zero"** (feet)

**METAR** makes no distinction between a partial obscuration and a cloud layer in the body of a report. It encodes the obscuration as a cloud layer whose base is below **50 feet**.

Example: **1/8SM FG BKN000** (in remarks: **FG BKN000**)  
**"Visibility One-eighth, fog, broken clouds less than five zero"** (feet)  
(in remarks) **"Fog obscuring five to seven-eighths of the sky"**

Example: **SCT000** (in remarks: **FU SCT000**)  
**"Scattered clouds less than five zero"** (feet)  
(in remarks) **"Smoke obscuring three to four eighths of the sky"**

If a cloud layer aloft is less than fifty feet in height and **not** ground based, remarks will **not** be shown. The layer is considered the first layer aloft.



# Sky Conditions

Sky cover is reported in **EIGHTHS** of coverage using the below contractions:

<b>Reportable Contractions</b>	<b>Meaning</b>	<b>Summation Amount</b>
<b>VV</b>	<b>Indefinite Ceiling (vertical visibility)</b>	<b>8/8</b>
<b>SKC or CLR</b>	<b>Clear</b>	<b>0 or 0 below 12,000</b>
<b>FEW</b>	<b>Few</b>	<b>&gt; 0 but ≤ 2/8</b>
<b>SCT</b>	<b>Scattered</b>	<b>3/8 to 4/8</b>
<b>BKN</b>	<b>Broken</b>	<b>5/8 to 7/8</b>
<b>OVC</b>	<b>Overcast</b>	<b>8/8</b>
<b>CB</b>	<b>Cumulonimbus</b>	<b>When present</b>
<b>TCU</b>	<b>Towering Cumulus</b>	<b>When present</b>

Coverage of clouds **precedes** cloud height with no space in between. And cloud height is always in three digits, **reported in hundreds of feet**.

Example: **SCT045 "Four thousand five hundred scattered"**

There is no **ceiling** designator, such as M (measured) or E (estimated) in a METAR. The ceiling is the first **BKN** or **OVC** layer aloft

- or -

A vertical visibility (**VV**) into a surface based phenomena ("**indefinite ceiling**").

Example: **BKN060 "Ceiling six thousand broken"**

- or -

Example: **VV004 "Indefinite ceiling four hundred"**

A new coverage designator "**FEW**" has been added to METAR, indicating cloud coverage **greater than zero and equal to or less than two-eighths**.

Example: **FEW030 "Few clouds at three thousand"**

**CB** and **TCU** are reported along **with the layer** with which their base is associated.

Example: **BKN020CB "Ceiling two thousand broken, cumulonimbus"**

- or -

Example: **SCT030TCU "Three thousand scattered, towering cumulus"**

The **direction from the station** of the **CB** or **TCU** clouds will be noted in the **Remarks** section of the METAR.

Example: **TCU W "Towering cumulus West"** (more examples, next page)

# Sky Conditions

Here are a few more examples of **CB** and **TCU** reported with multiple cloud layers:

Example: **SCT020TCU BKN040 BKN250 "Two thousand scattered towering cumulus, ceiling four thousand broken, two five thousand and broken"**  
(remarks) **TCU OHD "Towering cumulus overhead"**

Example: **SCT007 OVC014CB "Seven hundred scattered, ceiling one thousand four hundred overcast cumulonimbus"**  
(remarks) **CB W "Cumulonimbus West"**

**CB** (cumulonimbus) and **TCU** (towering cumulus) are considered significant clouds, as are the below listing of clouds, with the type of flight hazard they imply in parentheses:

<b>CBMAM</b>	Cumulonimbus mammatus (thunderstorm/severe turbulence)
<b>ACC</b>	Alto cumulus castellanus (severe turbulence)
<b>ACSL</b>	Standing lenticular alto cumulus (severe turbulence)
<b>CCSL</b>	Standing lenticular cirro cumulus (severe turbulence)
<b>ROTOR CLOUD</b>	Rotor cloud (violent, rotating severe turbulence)

As with **CB** and **TCU**, these significant clouds are further described in remarks, giving:

Distance (if known)  
Direction from station - or if overhead (**OHD**)  
Direction of movement (if known)  
**DSNT** (distant) - indicating the clouds are **beyond 10 miles** from the airport

Example: **CB N MOV E "Cumulonimbus North moving East"**

Example: **CBMAM DSNT W "Cumulonimbus mammatus distant West"**

Example: **ACC NE - E "Alto cumulus castellanus Northeast through East"**

Example: **APRNT ROTOR CLD W "Apparent rotor cloud West"**

Example: **ACSL OVR MT E "Standing lenticular alto cumulus over the mountain(s) East"**

# Sky Conditions

Whenever a **ceiling** below 3,000 feet is reported and it is **variable**, **CIG** will be shown in **remarks** followed by **the lowest and highest ceiling heights** separated by a **V**.

Example: **CIG 006V012 "Ceiling variable between six hundred and one thousand two hundred"**

When a **layer of clouds varies in sky cover**, the **variability range** is shown in **remarks**, separated by a **V**.

Example: **BKN V OVC "Broken layer variable to overcast"**

If there is **more than one cloud layer** of the same coverage, the **variable layer** will be identified in **remarks** by including the layer height.

Example: **BKN015 V OVC "Broken layer at one thousand five hundred variable to overcast"**

When sky conditions include a layer aloft, other than clouds, such as smoke or haze, the type of phenomena, sky cover, and height are shown in remarks.

Example: **BKN010 "Ceiling one thousand broken"**  
(remarks) **HZ BKN 010 "Broken layer of haze aloft, based at one thousand"**

The sky cover **summation amount** for a given layer of clouds is the sum of the sky cover of all lower cloud layers plus the layer evaluated, all added together.

Automated weather reporting stations may report up to three cloud layers and cannot report clouds above 12,000 feet.

Manual weather reporting stations report no more than six cloud layers.

At weather reporting stations located in the mountains, if a cloud layer is reported that is below the station level height, the height will be shown as three solidus, **///**.

**SPECI** weather reports will be issued if the ceiling forms or dissipates, decreases to less than, or if below, increases to equal or exceed:

- 3,000 feet    - 1,500 feet    - 1,000 feet    - 500 feet
- the lowest standard instrument approach procedure minimum as published. If none published, then 200 feet.
- a layer of clouds or obscurations aloft forms below 1,000 feet if no layer was reported below 1,000 feet in the previous weather report.

# Temperature and Dewpoint

Temperature/Dew Point is reported in two digits each in whole degrees **CELSIUS**, separated by a solidus (/).

Example: **15/08** "Temperature one five, dew point eight"

Temperatures and dew points below zero are prefixed by an **M**.

Example: **M03/M05** "Temperature minus three, dew point minus five"

If the temperature is available but the dew point is missing, the temperature is shown followed by a solidus (/).

Example: **23/** "Temperature two three, dew point missing"

If the **temperature** is **missing**, the group is **omitted** from the METAR.

An air mass with a **three degree or less** temperature/dew point spread is considered to be **saturated**.

To get a feel for Celsius temperatures, think of:

Heat wave conditions are about 40 degrees Celsius (104 degrees Fahrenheit)

Normal body temperature is 37 degrees Celsius (98.6 degrees Fahrenheit)

A hot summer day is 30 degrees Celsius and above.

A nice spring day is about 20 degrees Celsius.

Sweater weather is in the teens (about 15 degrees Celsius).

Jacket weather is in the single digits (about 5 degrees Celsius).

Coat weather is below zero (about minus 3 degrees Celsius).

Conversion formulas:

Celsius temperature X 9/5 + 32 = Fahrenheit temperature

Fahrenheit temperature - 32 X 5/9 = Celsius temperature

# TEMPERATURES – Celsius to Fahrenheit

C	F	C	F	C	F
41	105	22	71	03	37
40	104	21	70	02	36
39	103	21	69	02	35
39	102	20	68	01	34
38	101	19	67	01	33
38	100	19	66	00	32
37	99	18	65	M00	31
37	98	18	64	M01	30
36	97	17	63	M02	29
36	96	17	62	M02	28
35	95	16	61	M03	27
34	94	16	60	M03	26
34	93	15	59	M04	25
33	92	14	58	M04	24
33	91	14	57	M05	23
32	90	13	56	M05	22
32	89	13	55	M06	21
31	88	12	54	M06	20
31	87	12	53	M07	19
30	86	11	52	M08	18
29	85	11	51	M08	17
29	84	10	50	M09	16
28	83	09	49	M09	15
28	82	09	48	M10	14
28	81	08	47	M10	13
27	80	08	46	M11	12
26	79	07	45	M11	11
26	78	07	44	M12	10
25	77	06	43	M13	09
24	76	06	42	M13	08
24	75	05	41	M14	07
23	74	04	40	M14	06
23	73	04	39	M15	05
22	72	03	38	M16	04

# Altimeter

The altimeter setting is reported in four digits representing tens, units, tenths, and hundredths of inches of mercury.

The decimal is not noted or stated.

It is prefixed with an **A**. An altimeter setting of 29.92 inches of mercury would be depicted as below:

Example: **A2992** "Altimeter two niner niner two"

When the pressure is rising or falling at a **rate** of at least 0.06 inches per hour and the pressure change totals 0.02 inches or more at the time of the observation, **remarks** will show **PRESRR** or **PRESFR** respectively.

Example: **PRESRR** (remarks) "Pressure rising rapidly"

Example: **PRESFR** (remarks) "Pressure falling rapidly"

At some designated stations, the **sea-level pressure** is shown in remarks where **SLP** is followed by the sea-level pressure in **hectopascals** (millibars).

Example: **SLP982** (remarks) "Sea-level pressure niner-niner eight point two"

**Do not confuse SLP with the altimeter setting.**

If sea-level pressure is not available, it will be shown as **SLPNO**.

# Remarks

Remarks are broken into two major groups:

- (1) Automated, Manual, and Plain Language  
followed by:
- (2) Additive and Maintenance Data

Items within each group are listed in a specific sequence (see listing below).

## **AUTOMATED, MANUAL, and PLAIN LANGUAGE ORDER of REMARKS:**

1. Volcanic Eruptions
2. Tornado (+FC) , Funnel Cloud (FC) or Waterspout (+FC)
3. Station Type (AO1 or AO2)
4. Peak Wind (PK WND)
5. Wind shift (WSHFT), Frontal passage (FROPA)
6. Tower visibility (TWR VIS) or Surface visibility (SFC VIS)
7. Variable visibility (VRB VIS)
8. Sector visibility (Sector VIS)
9. Visibility at second site (VIS @ 2nd Site)
10. Dispatch Visual Range
11. Lightning (frequency of lightning, type and location) (LTG)
12. Beginning & ending of precipitation or thunderstorms (TSTMS)
13. Thunderstorm (TSTM) location and movement (MVMT)
14. Hailstone (GR) size
15. Virga (precipitation that does not reach the ground)
16. Variable ceiling height (VRB CIG)
17. Obscuration
18. Variable (VRB) sky condition
19. Significant Cloud types (CB, CBMAM, TCU, ACC, ACSL, CCSL)
20. Sky cover at second site (Sky @ 2nd Site)
21. Pressure falling rapidly (PRESFR) or Pressure rising rapidly (PRESRR)
22. Sea-level pressure (SLP)
23. Aircraft Mishap (ACFT MSHP)
24. No Special weather report (NOSPECI)
25. Snow Increase (SNINCR)
26. Other Significant (SIG) information

## **ADDITIVE and AUTOMATED MAINTENANCE DATA:**

27. Hourly precipitation
28. Precipitation amount
29. 24 hour precipitation
30. Snow depth on ground
31. Water equivalent of snow
32. Cloud type

# Remarks

## Automated Manual, and Plain Language Order of Remarks (continued):

33. Duration of sunshine
34. Hourly temperature/dew point (tenths)
35. Maximum temperature
36. Minimum temperature
37. 24 hour maximum/minimum temperature
38. Pressure tendency
39. Sensor status:
  - PWINO (precipitation identifier sensor not available)
  - FRZANO (freezing rain sensor not available)
  - TSNO (thunderstorm information not available) A biggie - watch for this!
  - RVRNO (RVR system values not available)
  - PNO (precipitation amount not available)
  - VISNO (visibility at second location not available)
  - CHINO (sky condition at secondary location not available)
40. Maintenance indicator (\$) (maintenance needed on ASOS system)

Remarks are included in most observations. The contraction **RMK** follows the altimeter in the body of the METAR and precedes the remarks.

Weather phenomena **occurring within 5 statute miles** of the point of observation are **reported as at the station**.

Weather phenomena **occurring between 5 and 10 statute miles** of the point of observation are **reported as in the vicinity (VC)**.

Weather phenomena **occurring beyond 10 statute miles** of the point of observation are **reported as distant (DSNT)**.

**Direction** of weather phenomena are indicated by the eight points of the compass.

**Distance** remarks are **in statute miles - EXCEPT for automated lightning remarks** which are **in nautical miles**.

**Movement** of clouds or weather is indicated by the direction **toward** which the phenomenon is moving.

The following examples of remarks are listed in the order they would appear in a METAR. There are numerous duplications of these examples that were presented under the various weather element discussions in earlier sections. You may wish to refer to the weather element sections pertinent to the remark for further information so you can tie things together for a better understanding of the topic at hand.



# Remarks

An example of the remark is given which is then followed by a quotation of how the remark is spoken.

## 1. Volcanic Eruptions

Example: **MT. HOOD VOLCANO 50 MILES W ERUPTED 161410 LARGE ASH CLOUD EXTENDING TO APPROX 40000 FEET MOVING E**

**"Mt. Hood volcano five zero miles West, erupted at one four one zero. Large ash cloud extending to approximately four zero thousand feet, moving East."**

## 2. Tornado, Funnel Cloud, Waterspout (manual stations only)

Example: **TORNADO B15 DSNT SE**

**"Tornado began one five past the hour to the distant Southeast."**

## 3. Station Type (automated stations only)

Automated weather reporting stations will indicate one of two codes - **AO1** or **AO2**

**AO1** indicates a basic station **with no** weather discriminating equipment.

**AO2** indicates a station **with** weather discriminating equipment.

If AO1 or AO2 is not present, the report was generated by a person or a person has augmented the automated observation.

## 4. Peak Wind (PK WND) - Whenever the peak wind exceeds 25 knots, PK WND will in remarks.

Example: **PK WND 25035/1825**

**"Peak wind two five zero at three five occurred at one eight two five"**

Example: **PK WND 32040/26**

**"Peak wind three two zero at four zero occurred at two six past the hour"**

## 5. Wind Shift (WSHFT) (FROPA)

When a wind shift occurs, **WSHFT** is included in remarks followed by the time the wind shift **began** (with only the minutes reported). **FROPA** may be entered following the time if the wind shift is the result of a **frontal passage**.

(Continued, next page)

# Remarks

Example: **WSHFT 35 "Wind shift at three five minutes after the hour"**

Example: **WSHFT 40 FROPA  
"Windshift at four zero after the hour due to frontal passage"**

## 6. Tower Visibility (TWR VIS) or Surface Visibility (SFC VIS)

If either tower or surface visibility is less than four statute miles, the lesser of the two will be reported in the body of the METAR, the greater visibility will be reported in remarks.

Example: **(in the body) 3/4SM (in remarks) TWR VIS 1  
(remarks) "Tower visibility one"**

Example: **(in the body) 2SM (in remarks) SFC VIS 2 1/2  
(remarks) "Surface visibility two and one-half"**

## 7. Variable Visibility (VRB VIS)

When the **prevailing visibility rapidly increases or decreases by 1/2 statute mile or more**, during a weather observation, **and the average prevailing visibility is less than three statute miles, the visibility is variable**. Variable visibility is shown in remarks with the minimum and maximum visibility values.

Example: **VIS 1 V 2 "Visibility variable between one and two"**

## 8. Sector Visibility (Sector VIS)

Sector visibility is shown in remarks when it differs from the prevailing visibility by one or more reportable values and either the prevailing or sector visibility is less than three miles.

Example: **VIS N 2 "Visibility North two"**

## 9. Visibility at second site (VIS @ 2nd Site)

For automated reporting stations having more than one visibility sensor, site specific visibility which is **lower** than the visibility shown in the body will be shown in remarks.

Example: **VIS 2 RY11 "Visibility two, at Runway one one"**

## 11. Lightning (LTG)

When **lightning is seen by the weather observer**, it will be included in remarks. The frequency of occurrence, type of lightning when observed, and the location will be

(continued next page)

# Remarks

indicated. The frequency and type of lightning contractions are listed below. The location is determined in reference to the point of observation.

## Frequency of Lightning

**OCNL "Occasional" (less than 1 flash per minute)**  
**FRQ "Frequent" (about 1 to 6 flashes per minute)**  
**CONS "Continuous" (more than 6 flashes per minute)**

## Type of Lightning

**CG "Cloud to ground"**  
**IC "In cloud"**  
**CC "Cloud to cloud"**  
**CA "Cloud to air"**

Examples:

**OCNL LTGICCG SW "Occasional lightning in cloud and cloud to ground Southwest"**  
**FRQ LTG VC "Frequent lightning in the vicinity of the station"**  
**CONS LTGCC NE "Continuous lightning cloud to cloud, Northeast"**  
**LTG DSNT S "Lightning distant South"**

When lightning is **detected by an automated** weather reporting system:

**within 5 nautical miles** of the Airport Location Point (ALP), it will be reported as **TS** (thunderstorm) in the body of the report with no remarks.

**between 5 and 10 nautical miles** of the ALP, it will be reported as **VCTS** (thunderstorms in the vicinity) in the body of the report with no remark.

beyond 10 but less than 30 nautical miles of the ALP, it will be reported in remarks only as **LGT DSNT** (lightning distant) followed by the direction from the Airport Location Point (ALP).

## 12. Beginning/Ending of Precipitation/Thunderstorms

### Precipitation

When precipitation begins or ends, remarks will show the type of precipitation as well as the beginning and/or ending time(s) of occurrence. Intensity qualifiers are not shown. Only the minutes are required if the hour can be inferred from the report time. Types of precipitation may be combined if beginning or ending times are the same.

(continued next page)

# Remarks

These remarks are not required in SPECI reports but will be shown in the next METAR.

**Example: RAB05E30SNB20E55**

**"Rain began at zero five, ended at three zero, snow began at two zero, ended at five five"**

**Example: RABSNB20E55**

**"Rain and snow began at two zero, ended at five five"**

**Example: RAB20SNB20**

**"Rain and snow began at two zero"**

## Thunderstorms

When thunderstorms begin or end, remarks will show the thunderstorm as well as the beginning and/or ending time(s) of occurrence. Only minutes will be shown if the hour can be inferred from the time of the weather report.

These remarks **are required** in SPECI's and **will also be shown** in the next METAR.

**Example: TSB05E40 "Thunderstorm began at zero five, ended at four zero"**

## 13. Thunderstorm (TSTM) Location and Movement (MVMT)

Thunderstorm(s) location and movement will be shown in remarks as **TS** followed by location and movement.

Examples:

**TS OHD MOV E "Thunderstorm overhead, moving East"**

**TS VC NE MOV E "Thunderstorm in the vicinity Northeast, moving East"**

**TS DSNT N MOV SE "Thunderstorm distant North, moving Southeast"**

## 14. Hailstone Size (GR)

The size of the **largest hailstones**, in 1/4 inch increments, is shown in remarks preceded with the contraction for hail, **GR**.

If **small hail or snow pellets (GS)** are encoded in the body of the report, no remark will be shown in reference to size.

**Example: GR 3/4 "Hailstones three quarter inch in diameter"**

# Remarks

## 15. Virga

When **precipitation** is observed but **is not reaching the ground**, **VIRGA** is shown in remarks. The direction from the station may also be reported.

Examples:

**VIRGA "Virga at the station"**

**VIRGA W "Virga West"**

**VIRGA DSNT SE "Virga distant Southeast"**

## 16. Variable Ceiling (VRB CIG)

Whenever the **ceiling is below 3,000 feet** and is variable, the remark **CIG** is shown followed with the lowest and highest ceiling heights.

Example: **CIG 005V010**

**"Ceiling variable between five hundred and one thousand"**

## 17. Obscurations

When an obscuration (**surface or aloft**) is observed, the obscuring phenomenon followed by the amount of the obscuration (**FEW, SCT, BKN**), followed by the layer height is shown in remarks.

Examples:

**FG FEW000 "Fog obscuring one to two-eighths of the sky"**

**HZ SCT000 "Haze obscuring three to four-eighths of the sky"**

**FU BKN020 "Broken layer of smoke aloft, based at two thousand"**

## 18. Variable Sky Condition

When a layer that is **3,000 feet or less** is varying in sky cover, remarks will show the variability range.

Example: **SCT V BKN "Scattered variable broken"**

If there is **more than one cloud layer**, the variable layer will be identified by including the layer height

Example: **BKN025 V OVC**

**"Two thousand five hundred broken variable overcast"**

# Remarks

## 19. Significant Cloud Types

Significant clouds will be shown in remarks indicating direction from station and direction of movement (if known). If the cloud is **beyond 10 miles** from the airport, **DSNT** will indicate "**distant**". Examples of significant clouds with remarks are listed below:

Examples:

<b>CB W MOV E</b>	<b>"Cumulonimbus West moving East"</b>
<b>CBMAM DSNT N</b>	<b>"Cumulonimbus mammatus distant North"</b>
<b>TCU OHD</b>	<b>"Towering cumulus overhead"</b>
<b>TCU E</b>	<b>"Towering cumulus East"</b>
<b>ACC E</b>	<b>"Alto cumulus castellanus East"</b>
<b>ACSL NW-N</b>	<b>"Standing lenticular altocumulus Northwest to North"</b>

## 20. Sky @ 2nd Site (Ceiling)

Some automated weather reporting stations may show site specific cloud heights at a secondary location in remarks. The remark format is **CIG (cloud height) (location)**.

Example: **CIG 010 RY22 "Ceiling one thousand at runway two two"**

## 21. Pressure Rising/Falling Rapidly (PRESRR/PRESFR)

At designated stations, when the pressure is rising or falling at a **rate** of at least 0.06 inch per hour and the pressure change totals 0.02 or more at the time of observation, remarks will show **PRESRR** or **PRESFR** respectively.

## 22. Sea-Level Pressure (SLP)

At designated stations that report sea-level pressure, this remark begins with **SLP** and is coded using tens, units, and tenths of sea-level pressure in hectopascals (same as millibars). **If no sea-level pressure is available**, it will be shown as **SLPNO**.

Example: **SLP132 "Sea-level pressure one zero one three point two hectopascals"**

## 23. Aircraft Mishap (ACFT MSHP)

A weather report is taken after an aircraft incident or accident to document weather conditions. **This report is not transmitted over the weather circuits.**

# Remarks

## 24. No SPECI Available

At manual weather observing stations that do not take special weather reports, **NOSPECI** is shown in remarks of all METAR reports.

## 25. Snow Increasing Rapidly (SNINCR)

This is reported at designated stations whenever **snow depth increases by 1 inch or more in the past hour**. The remark **SNINCR** is followed with the depth increase in the past hour, then a solidus ( / ), and **then the total snow depth on the ground** at the time of the weather report.

Example: **SNINCR 2/10 "Snow increase two inches during the past hour total depth on the ground of ten inches"**

## 26. Other significant information

Operationally significant information such as fog dispersal operations, runway conditions, or first and last reports may be added to remarks here.

### **ADDITIVE and AUTOMATED MAINTENANCE DATA:**

Additive data groups are only reported at designated weather reporting stations. The maintenance data groups are only reported from automated weather reporting stations. Most remarks in this category are not operationally significant for aviation purposes and are used by meteorologists. Below are a few remarks that have significance to pilots by indicating the unavailability of certain weather measuring sensors.

If the **RVR** element in the body of the weather report should be reported but is **missing**, **RVRNO** will be shown in remarks.

Example: **RVRNO "Runway visual range information not available"**

If an automated weather reporting station is equipped with the following sensors and they are not working, the following remarks will be shown:

<b>PWINO</b>	<b>"Present weather identifier not available"</b>
<b>PNO</b>	<b>"Precipitation amount not available"</b>
<b>FZRANO</b>	<b>"Freezing rain information not available"</b>
<b>TSNO</b>	<b>"Thunderstorm information not available"</b> (watch for this!)
<b>VISNO</b>	<b>"Visibility sensor information not available"</b>
<b>CHINO</b>	<b>"Cloud height indicator information not available"</b>

# Remarks

Automated weather reporting stations with secondary site sensors may show in remarks:

**VISNO (runway) "Visibility sensor information not available at runway xx"**

**CHINO (runway) "Cloud height indicator information not available at  
runway xx"**

## **Maintenance Indicator ( \$ )**

A maintenance indicator sign, \$, is appended to the end of an **automated weather report** when the unit detects that **maintenance is needed on the system**.



# **TAF**

## **Routine Aviation Terminal Forecast**

**Issued every 6 hours:**

**0000Z 0600Z 1200Z 1800Z**

A first encounter with a TAF (Routine Aviation Terminal Forecast) can be a mind boggling experience. However by carefully examining a TAF while seeking four key words ( **FM**, **TEMPO**, **BCMG**, **PROB30**, **PROB40** ) your ability to interpret a TAF will be much easier.

Think of **FM** as "**after**", meaning a rapid change in weather **occurring within 1 hour**

See page **54** for a complete discussion of **FM**.

Think of **BCMG** as "**a gradual change**" of weather.

See page **54, 55** for a complete discussion of **BCMG**.

Think of **TEMPO** as "**occasional**".

See page **55** for a complete discussion of **TEMPO**.

Think of **PROB30** as "a **slight chance**" of weather occurring with a **10-29% probability**.

Think of **PROB40** as "**a chance**" of weather occurring with a **30-50% probability**.

See page **53** for a complete discussion of **PROB30** and **PROB40**.

### **A Special Note About NSW:**

Be very careful with the contraction **NSW** (**No significant weather**). This does not mean the weather is excellent VFR or perhaps thought of as "Clear and unrestricted visibility".

- REMEMBER -

When **NSW** appears in a TAF, it only indicates obstructions to visibility or precipitation previously noted is expected to end. Pay special note to the sky condition (cloud bases), which could be quite low. So low, as a matter of fact, that VFR flight is not possible.

See page **51** for more information on **NSW**.

# Meters to Miles Conversion Chart

Military TAFs are a little different in format, which is not discussed here. However, a big distinction is that visibilities are given in meters in military TAFs. The below chart is available to convert meters to miles, if needed.

<u>METERS</u>	<u>STATUTE MILES</u>
0000	0
0100	1/16
0200	1/8
0300	3/16
0400	1/4
0500	5/16
0600	3/8
0800	1/2
1000	5/8
1200	3/4
1400	7/8
1600	1
1800	1-1/8
2000	1-1/4
2200	1-3/8
2400	1-1/2
2600	1-5/8
2800	1-3/4
3000	1-7/8
3200	2
3600	2-1/4
4000	2-1/2
4800	3
6000	4
8000	5
9000	6
9999	More than 6

# TAF

A Routine Aviation Terminal Forecast (TAF) is a concise statement of the expected meteorological conditions at an airport during a specified period (usually 24 hours). Each country is allowed to make modifications or exceptions to the code for use in each particular country. The TAF code, as described here, is the one used in the United States.

As of November, 2008, 32 of the larger air carrier “high-impact” U.S. airports issue 30 hour TAFs. A listing of these airports follows page 49, on page 49-A. Valid **date**/time groups identify forecast data since 30 hour TAFs can carry over into a second day. All other TAFs remain valid for a 24 hour time period containing **date**/time groups, as well.

TAF's use the same weather code found in METAR weather reports. Detailed explanations of weather coding is found in the METAR sections of this book.

## TAF REPORT ELEMENTS

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030  
TEMPO 0513/0516 1 1/2SM BR  
FM051600 16010KT P6SM SKC  
BECMG 0522/0524 20013G20KT 4SM SHRA OVC020  
PROB40 0600/0606 2SM TSRA OVC008CB  
BECMG 0606/0608 21015KT P6SM NSW SCT040**

A TAF report contains the following sequence of elements in the following order:

1. Type of Report
2. ICAO Station Identifier
3. Valid Period Date and Time
4. Forecast Meteorological Conditions

The international TAF also contains forecast temperature, icing and turbulence. These three elements are not included in National Weather Service prepared TAF's.

The U.S. has no requirement to forecast temperatures in a forecast and the National Weather Service will continue to forecast icing and turbulence in AIRMETS and SIGMETS.

The following paragraphs describe the elements in a TAF. A sample TAF will accompany each paragraph with the subject element that is under discussion **HIGHLIGHTED in this manner.**

# TAF

## TYPE OF REPORT

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The report header will always appear as the first element in the TAF. There are two types of TAF's: A routine forecast, **TAF**; and an amended forecast, **TAF AMD**. An amended TAF is issued when the current TAF no longer adequately describes the ongoing weather or the forecaster feels the TAF is not representative of the current or expected weather.

Corrected (**COR**) or delayed (**RTD**) TAF's are identified only in the communications header of a transmitted TAF. This header precedes the forecast text. The communications header will not be displayed when the TAF is viewed.

Example:

**TAF** - terminal forecast  
**TAF AMD** - amended terminal forecast

## ICAO STATION IDENTIFIER

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The TAF code uses ICAO four-letter location identifiers as described in the METAR section.

The above location identifier (**KOKC**) is Oklahoma City, OK, Will Rogers World Airport.

# TAF

## DATE and TIME of ORIGIN

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

This element is the UTC date and time the forecast is actually **prepared**. The format is a two-digit date and four digit time followed, without a space, by the letter **Z**. Routine TAF's are prepared and filed approximately one-half hour before scheduled issuance times. TAF's are scheduled for issuance four times daily at **0000Z, 0600Z, 1200Z, and 1800Z**.

Example:

**091050Z** - Forecast prepared on the ninth day of the month at 1050Z

## VALID PERIOD DATE and TIME

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The UTC valid period of the forecast is a two-digit date followed by the two-digit beginning hour and two-digit ending hour. Routine TAF's are valid for 24 hours. Valid periods **beginning** at 0000Z are indicated as **00**. Valid periods **ending** at 0000Z are indicated as **24**. The **24** indication applies to all time group ending times ending at 0000Z. 32 air carrier airports listed on the following page issue 30 hour TAFs.

In the case of an amended forecast, or a forecast which is corrected or delayed, the valid period may be less than 24 hours. Where an airport or terminal operates on a part-time basis (less than 24 hours/day), the TAF's issued for those locations will have the abbreviated statement "**NIL AMD SKED (closing time)Z**," added to the end of the forecast. For the TAF's issued while these locations are closed, the word **NIL** will appear in place of the forecast text. A delayed (RTD) forecast will then be issued for these locations **after two complete observations are received**.

Examples:

**912/1012** - Forecast valid from the ninth at 1200Z til the tenth at 1200Z.

**1100/1124** - Forecast valid from the eleventh at 0000Z til the twelfth at 0000Z.

**0105/0124** - Amended forecast valid from the first at 0500Z til the second at 0000Z.

# TAF

Effective 1800 UTC on November 5, 2008, the TAFs for 32 air carrier high-impact U.S. airports cover a 30 hour time period. Valid **date**/time groups identify forecast data since 30 hour TAFs can carry over into a second day. All other TAFs remain valid for a 24 hour time period containing **date**/time groups, as well.

Example **30 hour TAF** for the Philadelphia International Airport:

**TAF KPHL 051130Z 0512/0618 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The airports with the 30 hour TAFs include:

**ATL** - Hartsfield / Jackson Atlanta International  
**BDL** - Bradley International  
**BOS** - General Edward Lawrence Logan International  
**BWI** - Baltimore-Washington Thurgood Marshall International  
**CLE** - Cleveland/Hopkins International  
**CVG** - Cincinnati-Northern Kentucky International  
**DEN** - Denver International  
**DFW** - Dallas/Fort Worth International  
**DTW** - Detroit Metropolitan Wayne County  
**EWR** - Newark Liberty International  
**IAD** - Washington Dulles International  
**IAH** - George Bush International  
**IND** - Indianapolis International  
**JFK** - John F. Kennedy International  
**LAX** - Los Angeles International  
**MKE** - General Mitchell International  
**MSP** - Minneapolis-St. Paul International/Wold-Chamberlain  
**OAK** - Metropolitan Oakland International  
**ORD** - Chicago O'Hare International  
**PHL** - Philadelphia International  
**PIT** - Pittsburgh International  
**SAN** - San Diego International  
**SDF** - Louisville International/Standiford Field  
**SEA** - Seattle-Tacoma International  
**SFO** - San Francisco International  
**SLC** - Salt Lake City International  
**STL** - Lambert-St. Louis International  
**SWF** - Stewart International  
**PANC** - Ted Stevens Anchorage International  
**PHNL** - Honolulu International  
**PAFA** - Fairbanks International

# TAF

## FORECAST METEOROLOGICAL CONDITIONS

TAF KOKC 051130Z 0512/0612 **14008KT 5SM BR BKN030**  
TEMPO 0513/0516 1 1/2SM BR  
FM051600 16010KT P6SM SKC  
BECMG 0522/0524 20013G20KT 4SM SHRA OVC020  
PROB40 0600/0606 2SM TSRA OVC008CB  
BECMG 0606/0608 21015KT P6SM NSW SCT040

This is the body of the TAF. The basic format is:

### **Wind - Visibility - Weather - Sky Condition - Optional Data (Wind Shear)**

The wind, visibility, and sky condition elements are always included in the initial time group of the forecast. Weather is included in the initial time group only if significant to aviation. If a significant, lasting change in any of the elements is expected during the valid period, a new time period (FM, BECMG, TEMPO) with the changes is included.

An important distinction in a TAF to understand is that with the exception of the FM group, **the new time period (BECMG, TEMPO) will include only those elements which are expected to change.** For example, if a lowering of the visibility is expected but the wind is expected to remain the same, the new time period reflecting the lower visibility would **not** include a forecast wind. **The forecast wind would remain the same as in the previous time period, even though it is not mentioned in the new time period. You must refer back** to what precedes the BECMG, TEMPO time periods for forecast elements not mentioned after the BECMG, TEMPO time periods to obtain the complete forecast for that time period.

However, any **temporary (TEMPO)** conditions expected during a specific time period are included **for that time period only.**

The following describes the elements in the above TAF example.

### **Wind**

The wind group includes forecast **surface winds.** The surface wind forecast is the expected wind direction (first three digits) and speed (last two digits, or three, if 100 knots or greater). The contraction **KT**, follows to denote the units of wind speed in **knots.** Wind **gusts** are noted by the letter **G** appended to the wind speed followed by the highest expected gust (two digits, or three, if 100 knots or greater).

**Variable winds** are encoded when it is impossible to forecast a wind direction due to winds **associated with convective activity or low wind speeds.** A variable wind direction is noted by **VRB** where the three digit direction usually appears.

(continued, next page)

# TAF

Examples:

<b>18010KT</b>	"Wind one eight zero at one zero"
<b>35012G20KT</b>	"Wind three five zero at one two gust two zero"
<b>00000KT</b>	"Wind calm" (wind 3 knots or less)
<b>VRB16G28KT</b>	"Wind variable at one six gust two eight"

## Visibility

The expected prevailing visibility is forecast in statute miles and fractions of statute miles followed by **SM** to note the units of measure. Statute miles followed by fractions of statute miles are separated with a space.

Forecast visibility greater than 6 statute miles is indicated by coding **P6SM**. Directional or variable visibility is **not** forecast. And the visibility group is **omitted**, if missing.

Examples:

<b>1/2SM</b>	"Visibility one half"
<b>2 1/4SM</b>	"Visibility two and one quarter"
<b>5SM</b>	"Visibility five"
<b>P6SM</b>	"Visibility more than six"

## Weather

The expected weather phenomenon or phenomena is coded in TAFs using the same format, qualifiers, and phenomena contractions as METAR reports (except **UP**). Simply refer to the METAR sections of this book to decode the "weather" element.

Obscurations to vision will be forecast whenever the prevailing visibility is forecast to be 6 statute miles or less.

If no significant weather is expected to occur during a specific time period in the forecast, the weather group is **omitted** for that time period. If, after a time period in which significant weather has been forecast, a change to a forecast of no significant weather occurs, the contraction **NSW** (No Significant Weather) will appear as the weather group in the new time period. However, NSW is only included in BECMG or TEMPO groups.

This is a repeat, but definitely warrants mentioning again. Be very careful with the contraction **NSW** (**No significant weather**). This does not mean the weather is excellent VFR or perhaps thought of as "Clear and unrestricted visibility".

## REMEMBER

When **NSW** appears in a TAF, it only indicates obstructions to visibility or precipitation **previously** noted is expected to end. Pay special note to the sky condition (cloud bases), which could be quite low. So low, as a matter of fact, that VFR flight is not possible.



# TAF

## Sky Condition

TAF sky condition forecasts use the METAR format described in the METAR section.

Cumulonimbus clouds (**CB**) are the only cloud type forecast in TAF's.

Ceiling layers are not designated in the TAF code. For aviation purposes, the ceiling is the lowest broken or overcast layer - or vertical visibility into a complete obscuration.

When the sky is obscured due to a surface based phenomenon, vertical visibility (**VV**) into the obscuration is forecast. The format for vertical visibility is "**VV**" followed by a three digit height in hundreds of feet.

Examples:

**VV008**

"Indefinite ceiling eight hundred"

**SKC**

"Sky clear"

**SCT005 BKN025CB**

"Five hundred scattered, ceiling two thousand five hundred broken cumulonimbus clouds"

## Optional Data (Windshear)

Windshear is the forecast of **non-convective** low level winds (up to 2,000 feet) and is entered after the sky conditions when wind shear is expected. The forecast includes the height of the wind shear followed by the wind direction and wind speed at the indicated height. Height is given in hundreds of feet AGL up to and including 2,000 feet. Wind shear is encoded with the contraction, **WS**, followed by a three-digit height, slant character " / ", and winds at the height indicated in the same format as surface winds. The wind shear element is **omitted if not expected to occur**.

Example:

**WS010/18040KT**

- "Low level wind shear at one thousand, wind one eight zero at four zero"

Other items not included in domestic TAF's that may appear in international or some military TAF's as optional data following wind shear are:

Icing forecast - a coded group beginning with a 6 followed by five digits.

Turbulence forecast - a coded group beginning with a 5 followed by five digits.

Temperature forecast - a coded group beginning with a T followed by the temperature and time.

# TAF

## PROBABILITY FORECAST

The probability forecast indicates the probability or chance of thunderstorms or other precipitation events occurring, along with associated weather conditions (wind, visibility, and sky conditions).

### PROB40 = "Chance"

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The **PROB40** group is used when the occurrence of thunderstorms or precipitation is in **the 30% to less than 50% range**, thus the probability value **40** is appended to the **PROB** contraction. This is followed by a four digit group giving the **beginning hour** and **ending hour** of the time period during which the thunderstorms or precipitation is expected.

**Note:** **PROB40** will not be shown during the first six hours of a forecast.

Example:

**PROB40 1421/1502 1/2SM +TSRA**

“Chance between 2100Z on the fourteenth day of the month and 0200Z on the fifteenth day of the month of visibility one-half thunderstorm, heavy rain”

### PROB30 = "Slight Chance"

The **PROB30** group is used when the occurrence of thunderstorms or precipitation is in **the 10% to 29% range**. The probability value **30** is appended to the **PROB** contraction. This is followed by a four digit group giving the **beginning hour** and the **ending hour** of the time period during which the thunderstorms or precipitation is expected.

**Note:** **PROB30** will not be shown during the first six hours of a forecast.

Example:

**PROB30 0620/0622 2SM RA**

“Slight chance between 2000Z and 2200Z on the sixth day of the month of visibility two, rain”

# TAF

## FORECAST CHANGE INDICATORS

The following change indicators are used when either a rapid, gradual, or temporary change is expected in some or all of the forecast meteorological conditions. Each change indicator marks a time group within a TAF.

### FROM Group = "After" (A rapid change)

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The **FM** group is used when a **rapid change**, usually **occurring in less than one hour**, in prevailing conditions is expected.

Typically, a rapid change of prevailing conditions to a completely new set of prevailing conditions is associated with a synoptic feature passing through the terminal area (such as cold or warm frontal passage).

Appended to the **FM** indicator is the four-digit **hour and minute** the change is expected to **begin** and continues until the next change group or until the end of the current forecast.

A **FM** group will mark the beginning of a new line in a TAF. Each **FM** group contains all the required elements - wind, visibility, weather, and sky condition. Weather will be omitted in **FM** groups when it is not significant to aviation. **FM** groups will not include the contraction NSW.

Examples:

- FM230100 SKC** - "After 0100Z on the twenty-third day of the month, sky clear"
- FM051430 OVC020** - "After 1430Z on the fifth day of the month, ceiling two thousand overcast"

### BECOMING Group = "A gradual change"

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**  
**TEMPO 0513/0516 1 1/2SM BR**  
**FM051600 16010KT P6SM SKC**  
**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**  
**PROB40 0600/0606 2SM TSRA OVC008CB**  
**BECMG 0606/0608 21015KT P6SM NSW SCT040**

(continued next page)

# TAF

## **BECOMING Group** (Con't)

The **BECMG** group is used when a **gradual change** in conditions is expected over a longer time period, **usually two hours**. The time period when the change is expected is a four-digit group with the **beginning hour and the ending hour** of the change period, which follows the **BECMG** indicator. **The gradual change will occur at an unspecified time within this time period.**

**Only the changing forecast meteorological conditions are included in BECMG groups. The omitted conditions are carried over from the previous time group.** See page 50 for a detailed explanation.

Example:

**OVC012 BECMG 0314/0316 BKN020**

“Ceiling one thousand two hundred overcast. Then a gradual change to ceiling two thousand broken between 1400Z and 1600Z on the third day of the month”

## **TEMPORARY Group = "Occasional"** (Less than one hour)

**TAF KOKC 051130Z 0512/0612 14008KT 5SM BR BKN030**

**TEMPO 0513/0516 1 1/2SM BR**

**FM051600 16010KT P6SM SKC**

**BECMG 0522/0524 20013G20KT 4SM SHRA OVC020**

**PROB40 0600/0606 2SM TSRA OVC008CB**

**BECMG 0606/0608 21015KT P6SM NSW SCT040**

The **TEMPO** group is used for any conditions in wind, visibility, weather, or sky condition which are **expected to last for generally less than an hour** at a time (**occasional**), and are expected to occur during less than half the time period.

The **TEMPO** indicator is followed by a four-digit group giving the **beginning hour and ending hour** of the time period during which the temporary conditions are expected.

**Only the changing forecast meteorological conditions are included in TEMPO groups. The omitted conditions are carried over from the previous time group.** See page 50 for a detailed explanation.

Example:

**SCT030 TEMPO 0419/0423 BKN030**

“Three thousand scattered with occasional ceilings three thousand broken between 1900Z and 2300Z on the fourth day of the month”

# NOTAM CONTRACTIONS

AAWF	Auxiliary Aviation Weather Facility
ABN	airport beacon
ABV	above
ACC	area control center (ARTCC)
ACCUM	accumulate
ACFT	aircraft
ACR	air carrier
ACT	active
AD	aerodrome (airport) (also a Notam keyword)
ADJ	adjacent
ADZD	advised
AFD	airport facility directory
AGL	above ground level
AIRSPACE	airspace (also a Notam keyword)
ALS	approach lighting system
ALT	altitude
ALTM	altimeter
ALTN	alternate
ALTNLY	alternately
ALSTG	altimeter setting
AMDT	amendment
AMGR	airport manager
AMOS	Automatic Meteorological Observing System
AP	airport
APCH	approach
AP LGT	airport lighting
APP	approach control
APRON	apron (also a Notam keyword)
ARFF	aircraft rescue and fire fighting
ARR	arrive, arrival
ASOS	Automatic Surface Observing System
ASPH	asphalt
ATC	air traffic control
ATCCC	Air Traffic Control Command Center
ATIS	automatic terminal information service
AUTH	authority
AUTOB	Automatic Weather Reporting System
AVBL	available
AWOS	Automatic Weather Observing/Reporting System
AWY	airway
AZM	azimuth
BA FAIR	braking action fair
BA NIL	braking action nil
BA POOR	braking action poor
BC	back course
BCN	beacon
BERM	snowbank/s containing earth/gravel

# NOTAM CONTRACTIONS

BLW	below
BND	bound
BRG	bearing
BYD	beyond
C	center
CAAS	Class A Airspace
CAT	category
CBAS	Class B Airspace
CBSA	Class B Surface Area
CCAS	Class C Airspace
CCLKWS	counterclockwise
CCSA	Class C Surface Area
CD	clearance delivery
CDAS	Class D Airspace
CDSA	Class D Surface Area
CEAS	Class E Airspace
CESA	Class E Surface Area
CFR	Code of Federal Regulations
CGAS	Class G Airspace
CHAN	channel
CHG	change or modification
CIG	ceiling
CK	check
CL	center line
CLKWS	clockwise
CLR	clearance, clear/s, cleared to
CLSD	closed
CMB	climb
CMSND	commissioned
CNL	cancel
CNTRLN	centerline
COM	communications (also a Notam keyword)
CONC	concrete
CPD	coupled
CRS	course
CTC	contact
CTL	control
DALGT	daylight
DCMSN	decommission
DCMSND	decommissioned
DCT	direct
DEGS	degrees
DEP	depart, departure
DEP PROC	departure procedure
DH	decision height
DISABLD	disabled
DIST	distance

# NOTAM CONTRACTIONS

DLA	delay or delayed
DLT	delete
DLY	daily
DME	distance measuring equipment
DMSTN	demonstration
DP	dewpoint temperature
DRFT	snowbank/s caused by wind action
DSPLCD	displaced
E	east
EB	eastbound
EFAS	en route flight advisory service
ELEV	elevation
ENG	engine
ENRT	en route
ENTR	entire
EXC	except
FAC	facility or facilities
FAF	final approach fix
FAN MKR	fan marker
FDC	flight data center
FI/P	flight inspection permanent
FI/T	flight inspection temporary
FM	from
FNA	final approach
FPM	feet per minute
FREQ	frequency
FRH	fly runway heading
FRI	Friday
FRZN	frozen
FSS	automated/flight service station
FT	foot or feet
GC	ground control
GCA	ground control approach
GCP	Ground Check Point
GOVT	government
GP	glide path
GPS	Global Position System
GRVL	gravel
HAA	height above airport
HAT	height above touchdown
HDG	heading
HEL	helicopter
HELI	heliport
HIRL	high intensity runway lights
HIWAS	hazardous inflight weather advisory service
HLDG	holding
HOL	holiday

# NOTAM CONTRACTIONS

HP	holding pattern
HR	hour
IAF	initial approach fix
IAP	instrument approach procedure
ID	identification
IDENT	identify, identifier, identification
IF	intermediate fix
ILS	instrument landing system
IM	inner marker
IMC	instrument meteorological conditions
IN	inch, inches
INBD	inbound
INDEFLY	indefinitely
INFO	information
INOP	inoperative
INSTR	instrument
INT	intersection
INTL	international
INTST	intensity
IR	ice on runway/s
KT	knots
L	left
LAA	local airport advisory
LAT	latitude
LAWRS	Limited Aviation Weather reporting Station
LB	pound/s
LC	local control
LOC	local, locally, location
LCTD	located
LDA	localizer type directional aid
LGT	light or lighting
LGTD	lighted
LIRL	low intensity runway lights
LLWAS	low level wind shear alert system
LM	compass locator at ILS middle marker
LDG	landing
LLZ	localizer
LO	compass locator at ILS outer marker
LONG	longitude
LRN	long range navigation
LSR	loose snow on runway/s
LT	left turn
MAG	magnetic
MAINT	maintain, maintenance
MALS	medium intensity approach light system



# NOTAM CONTRACTIONS

MALSF	medium intensity approach light system with sequenced flasher indicator lights
MALSR	medium intensity approach light system with runway alignment
MAPT	missed approach point
MCA	minimum crossing altitude
MDA	minimum descent altitude
MEA	minimum enroute altitude
MED	medium
MIN	minute/s
MIRL	medium intensity runway lights
MKR	marker
MLS	microwave landing system
MM	middle marker
MNM	minimum
MNT	monitor, monitoring, monitored
MOC	minimum obstruction clearance
MON	Monday
MRA	minimum reception altitude
MSA	minimum safe altitude or minimum sector altitude
MSAW	minimum safe altitude warning
MSG	message
MSL	mean sea level
MU	mu meters
MUD	mud
MUNI	municipal
N	north
NA	not authorized
NAV	navigation/navigation aids (also a Notam keyword)
NB	northbound
NDB	non-directional radio beacon
NE	northeast
NGT	night
NM	nautical miles
NMR	nautical mile radius
NONSTD	nonstandard
NOPT	no procedure turn required
NR	number
NTAP	notice to airmen publication
NVG	night vision goggles
NW	northwest
O	other aeronautical information (a Notam keyword)
OBSC	obscured, obscure, obscuring
OBST	obstruction, obstacle (also a Notam keyword)
OM	outer marker
OPR	operate, operator, operative

# NOTAM CONTRACTIONS

OPS	operation/s
ORIG	original
OTS	out of service
OVR	over
PAEW	personnel and equipment working
PAX	passenger/s
PAPI	precision approach path indicator
PAR	precision approach radar
PARL	parallel
PAT	pattern
PCL	pilot controlled lighting
PERM	permanent
PJE	parachute jumping exercise
PLA	practice low approach
PLW	plow, plowed
PN	prior notice required
PPR	prior permission required
PRN	psuedo random noise
PROC	procedure
PROP	propeller
PSR	packed snow on runway/s
PTCHY	patchy
PTN	procedure turn
PVT	private
RAA	Remote Airport Advisory
RAIL	runway alignment indicator lights
RAMOS	Remote Automatic Meteorological Observing System
RAMP	ramp (also a Notam keyword)
RCAG	remote communications air to ground facility
RCL	runway center line
RCLL	runway center line lights
RCO	remote communications outlet
REC	receive or receiver
REIL	runway end lights
RELCTD	relocated
REP	report
RLLS	runway lead-in light system
RMNDR	remainder
RMK	remark/s
RNAV	area navigation
RPLC	replace
RQRD	required
RRL	runway remaining lights
RSR	en route surveillance radar
RSVN	reservation
RT	right turn
RTE	route

# NOTAM CONTRACTIONS

RTR	remote transmitter/receiver
RTS	return to service
RUF	rough
RVR	runway visual range
RVRM	runway visual range midpoint
RVRR	runway visual range rollout
RVRT	runway visual range touchdown
RWY	runway (also a Notam keyword)
S	south
SA	sand, sanded
SAT	Saturday
SAWRS	Supplementary Aviation Weather Reporting Station
SB	southbound
SDF	simplified directional facility
SE	southeast
SFL	sequence flashing lights
SIMUL	simultaneous or simultaneously
SIR	packed or compacted snow and ice on runway/s
SKED	scheduled or schedule
SLR	slush on runway/s
SN	snow
SNBNK	snowbank/s caused by plowing (windrow/s)
SNGL	single
SPD	speed
SSALF	simplified short approach lighting with sequence flashers
SSALR	simplified short approach lighting with runway alignment indicator lights
SSALS	simplified short approach lighting system
SSR	secondary surveillance radar
STA	straight-in approach
STAR	Standard Terminal Arrival
SUN	Sunday
SVC	service/services (also a Notam keyword)
SVN	satellite vehicle number
SW	southwest
SWEPT	swept or broom/ed
T	temperature
TACAN	tactical air navigation aid (both azimuth and DME)
TAR	terminal area surveillance radar
TDZ	touchdown zone
TDZ LGT	touchdown zone lights
TEMPO	temporary or temporarily
TFC	traffic
TFR	temporary flight restriction
TGL	touch and go landings
THN	thin

# NOTAM CONTRACTIONS

THR	threshold
THRU	through
THU	Thursday
TIL	until
TKOF	takeoff
TM	Traffic Management
TMPA	Traffic Management Program Alert
TRMNL	terminal
TRNG	training
TRSN	transition
TSNT	transient
TUE	Tuesday
TWR	airport control tower
TWY	taxiway (also a Notam keyword)
U	unverified aeronautical information (a Notam keyword)
UAV	unmanned air vehicle/s
UFN	until further notice
UNAVBL	unavailable
UNLGTD	unlighted
UNMKD	unmarked
UNMNT	unmonitored
UNREL	unreliable
UNUSBL	unusable
VASI	visual approach slope indicator system
VDP	visual descent point
VIA	by way of
VICE	instead/versus
VIS	visibility
VMC	visual meteorological conditions
VOL	volume
VOR	VHF omni-directional radio range
VORTAC	VOR and TACAN (collocated)
W	west
WB	westbound
WED	Wednesday
WEF	with effect from or effective from
WI	within
WKDAYS	Monday through Friday
WKEND	Saturday and Sunday
WND	wind
WPT	waypoint
WSR	wet snow on runway/s
WTR	water on runway/s
WX	weather

# THE 24 HOUR CLOCK

0100	=	1 a.m.
0200	=	2 a.m.
0300	=	3 a.m.
0400	=	4 a.m.
0500	=	5 a.m.
0600	=	6 a.m.
0700	=	7 a.m.
0800	=	8 a.m.
0900	=	9 a.m.
1000	=	10 a.m.
1100	=	11 a.m.
1200	=	12 p.m.
1300	=	1 p.m.
1400	=	2 p.m.
1500	=	3 p.m.
1600	=	4 p.m.
1700	=	5 p.m.
1800	=	6 p.m.
1900	=	7 p.m.
2000	=	8 p.m.
2100	=	9 p.m.
2200	=	10 p.m.
2300	=	11 p.m.
2400	=	12 a.m.

For the current accurate time, call the U.S. Naval Observatory Master Clock at 202-762-1401. The only cost is for standard telephone toll rates.

# COMPUTING "ZULU" TIME

## For Standard Time:

Eastern	Standard Time	add	5 hours
Central	Standard Time	add	6 hours
Mountain	Standard Time	add	7 hours
Pacific	Standard Time	add	8 hours
B.C.	Standard Time	add	8 hours
Yukon	Standard Time	add	8 hours
Alaska	Standard Time	add	9 hours
Bering	Standard Time	add	10 hours
Hawaii	Standard Time	add	10 hours

## For Daylight Savings Time:

Eastern	Daylight Savings	add	4 hours
Central	Daylight Savings	add	5 hours
Mountain	Daylight Savings	add	6 hours
Pacific	Daylight Savings	add	7 hours
B.C.	Daylight Savings	add	7 hours
Yukon	Daylight Savings	add	7 hours
Alaska	Daylight Savings	add	8 hours
Bering	Daylight Savings	add	9 hours
Hawaii	Daylight Savings	add	9 hours