UNITED REPUBLIC OF TANZANIA

MINISTRY OF TRANSPORT

TANZANIA METEOROLOGICAL AUTHORITY

COMMON CHALLENGES AND SIMPLIFIED WAY FOR MAINTAINING STANDARDS IN CODING AND DECODING AVIATION WEATHER REPORTS IN THE UNITED REPUBLIC OF TANZANIA

COMMON CHALLENGES AND SIMPLIFIED WAY FOR MAITAINING STANDARDS IN CODING AND DECODING AVIATION WEATHER REPORTS IN THE UNITED REPUBLIC OF TANZANIA

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EXECUTIVE SUMMARY

Meteorological report is a statement of observed meteorological conditions related to a specified time and location. Meteorological observation is the evaluation of one or more meteorological elements. Meteorological observation supports all human operations for safety of life and property including the aviation industry to avoid aircraft accidents.

Tanzania Meteorological Authority (TMA) is the designated authority in the United Republic of Tanzania (URT) responsible for observations, collection, processing, archiving and dissemination of weather and climate information. In order to comply with international and national requirements, TMA issues routine and non-routine aviation weather reports at regional airports (small aerodromes) and international airports to facilitate the safety and efficiency of air traffic operations. The disseminated reports need to reach the Air Traffic Services (ATS) in brevity, timely and efficiently. For this reason, WMO introduced a system of Meteorological codes (abbreviated language) which complies with the International Civil Aviation Organization (ICAO requirements to assure brevity when transmitting or exchanging aviation weather information at national, regional and global levels. However, reporting of aviation meteorological codes is commonly mistaken due to misinterpretation.

The mistakes in reporting aviation meteorological codes may mislead the users and affect aviation operations. It is recognized that these mistakes may be performed by observers due to misinterpretation of the ICAO weather report coding guidelines. Therefore, to maintain uniformity of responsibilities regarding to aviation meteorological coding, the common mistakes observed in reporting certain codes groups of aviation weather reports need to be addressed. Therefore, this hand book intends to explain some common mistakes and provide the best way of coding meteorological information for aviation weather services as per ICAO guidelines. For instance, several mistakes in reporting aviation meteorological coding groups for aviation services have been reported at various meteorological stations in the country as shown in chapter 2.

This handbook is written based on the experience obtained through reviewing and documenting the identified mistakes in the coding of aviation weather reports for surface wind, visibility and significant weather. The main objective of this handbook is to enhance the accuracy in coding aviation weather reports (METAR or SPECI) by reducing mistakes in reporting for the safety of the aviation operations.

The handbook comprises of two chapters: general description of aviation weather reports and, interpretation and coding surface wind, visibility and present weather groups. The handbook will be useful for operational assistance, training, and enhancing skills and competency of the observers.

The author's dedication to ensuring adherence to standards and addressing nonstandard reporting practices is commendable. By providing clear guidelines and explanations, this handbook aims to enhance the accuracy and consistency of meteorological reports, leading to safer and more efficient aviation operations.

This handbook stands as a valuable tool in simplifying the understanding of coding and decoding aviation weather reports, ultimately improving the safety and effectiveness of aviation operations in the United Republic of Tanzania. The implementation of standardized reporting practices will contribute to a safer and more reliable aviation industry in Tanzania. The reason for preparation of this handbook is that; after making follow-up on the METAR/ SPECI and reports from manned meteorological stations especial in Tanzania for long time, I discovered that there are many nonstandard reports in reporting some weather elements in weather report, especially wind, visibility and weather group. In order to maintain standards, I decided to prepare this handbook.

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LIST OF THE ABBREVIATIONS AND ACRONYMS

ATS	Air Traffic Services
AUTO	Automatic
BC	Patches
BL	Blowing
BR	Mist
COR	Correction
DR	Low drifting
DS	Dust storm
DU	Widespread dust
DZ	Drizzle
FC	Funnel cloud(s)
+FC	Tornado or water spout
FG	Fog
FU	Smoke
FZ	Freezing
GR	Hail
GS	Small hail
HZ	Haze
ICAO	International Civil Aviation Organization
KMH	Kilometre per hour
KT	Knots
MI	Shallow
MPS	Metre per second
NDV	No Directional Variations
NOSIG	No Significant Change
NSW	No Significant Weather
OBSC	Obscured
OVC	Overcast
PO	Dust/sand whirls (dust devils)
PL	Ice pellets

PR	Partial
PY	Spray
RA	Rain
RE	Recent
RMK	Remark
SG	Snow grains
SH	Shower(s)
SN	Snow
SS	Sandstorm
TMA	Tanzania Meteorological Authority
TS	Thunderstorm
UP	Unknown precipitation
URT	United Republic of Tanzania
VA	Volcanic Ash
VC	In the vicinity
VRB	Variable
WMO	World Meteorological Organization

DEFINITIONS

Actual time of observation: In case of a METAR**,** is the time at which the barometer is read.

Blowing: Is a descriptor used to indicates that dust (DU), sand (SA) or snow (SN) has been raised by the wind to a height of 2m (6ft) or more above ground level.

Body of report: Is that portion of a METAR or SPECI report beginning with the type of report and ending with the atmospheric pressure group.

Calm: Means the absence of air motion or wind with a speed of less than 1 knot.

Descriptors: Are qualifiers which further describe weather phenomena and are used with certain types of precipitation and obscurations.

Low drifting: Is a descriptor used to indicates that dust (DU), sand (SA) or snow (SN) has been raised by the wind to a height of less than 2m (6ft) above ground level.

Drizzle: Is fairly uniform precipitation composed of entirely of very small (fine) drops of liquid water with a diameter less than 0.5mm, very close to one another.

Duststorm: Is a severe weather condition characterized by strong winds and dust-filled air over a large area. Visibility is reduced to between 1000m and 500m.

Fog: Is a suspension of very small water droplets in the air near the earth's surface, which reduces horizontal visibility to less than 1000m.

Gust: Is the sudden increase of wind speed relative to its mean value lasting for a few second.

Hail: This is precipitation of small balls or pieces of ice with a diameter generally between 5 and 50mm, or sometimes more falling either separately or agglomerated into irregular lumps.

Haze: Is a suspension of extremely small dry particles in the air invisible to the naked eye, which reduce horizontal visibility to 5000m or less.

Ice pellets: This is precipitation of transparent or translucent ice particles which are spherical or regular, rarely conical, that cannot be crushed easily and have a diameter of 5mm or less.

Knot: Is defined as a nautical mile per hour.

Lightning: Is an intensive flash of light, which is produced after the collision between positive and negative charges in the same cloud or between two clouds or between a cloud and ground.

METAR: Is the name of the coded message for an aviation routine weather report.

Meteorological authority: Is the authority providing or arranging for the provision of meteorological service for international air navigation on behalf of a Contracting State.

Meteorological observation: Is the evaluation of one or more meteorological elements.

Meteorological report: Is a statement of observed meteorological conditions related to a specified time at the airport.

Meteorological visibility: Refers to the transparency of the atmosphere in relation to human vision.

Mist: Is the suspension of very small water droplets in the air, reducing horizontal visibility at least **1000 metres** but not more than **5000 metres**.

Obscuration: Is any phenomena in the atmosphere, other than precipitation, that reduces horizontal visibility.

Precipitation: **Is** any forms of water either liquid or solid, that falls from the cloud and reach the ground**.**

Prevailing visibility: Is the greatest visibility value that can be seen throughout at least half the horizon circle or within at least half of the surface of the aerodrome.

Rain: This is precipitation of liquid water drops of appreciable size, of more than 0.5mm diameter.

Sky clear: Means no any clouds are observed or detected from the point of observation.

Smoke: Is a suspension of small particles in the air produced by combustion which reduces horizontal visibility to 5000m or less.

Snow: This is precipitation of small ice crystals/sheets falling from a cloud. At very low temperatures, snowflakes are small and their structure simple. At temperatures close to freezing point, the individual flakes may be composed of a large number of ice crystals (predominantly star-shaped) and the flakes may have a diameter greater than 25mm.

Snow grains: These are precipitation of very small white and opaque grains of ice which fall from stratiform clouds and their diameter is generally less than 1mm.

Snow pellets: This is precipitation of white and opaque grains of ice and have a diameter of less than 5mm.

SPECI: Is the name of the coded message for an aviation special weather report.

Surface wind: Is the wind blowing near the earth's surface in the horizontal at a standard height of 10m above ground.

Thunder: Is a loud rumbling sound that follows a flash of lightning, caused by the discharge of atmospheric electrical charge.

Thunderstorm: Is a local storm produced by cumulonimbus cloud that is accompanied by lightning and/or thunder.

Veering: Is a clockwise change in the wind direction.

Virga: Is the rain or snow that falls from a cloud but evaporate before it reaches the ground.

Wind: Is the movement of air over the earth's surface in the horizontal from areas of higher pressure to areas of lower pressure.

Wind direction: Is the direction from which the wind is blowing.

For example, an easterly wind is blowing from the east, not toward the east. It is reported with reference to true north, or 360 degrees on the compass, and expressed to the nearest 10 degrees, or to one of the 16 points of the compass (N, NE, W, NW, etc.).

Wind speed: Is the rate of the motion of the air on a unit of time.

CHAPTER ONE 1

1.0 GENERAL DESCRIPTION OF AVIATION WEATHER REPORTS

The observed meteorological parameters are used to develop coded aviation meteorological reports which are normally transmitted to Air Traffic Services (ATS) and National Meteorological Center. The coded report is necessary for brevity, rapid and efficient transmission for aviation services. Therefore, a system of aviation Meteorological codes has been developed for the transmission of weather reports.

1.1 Aviation Meteorological code

Aviation meteorological code is the abbreviated language specifically used to ensure brevity when transmitting or exchange of meteorological information at national regional and global levels. The codes are composed of a set of groups, whereby each group collectively carries a measure of meteorological information or element(s) (e.g. wind, visibility and present weather). Therefore, in order to understand any meteorological code, it is better to study the symbolic form which indicates the order in which various figures must be placed.

1.2 Aviation weather reports

Aviation weather reports are designed to give accurate depictions of current weather conditions. Each report provides current information that is updated at different times. There are two types of aviation weather reports which include routine weather reports (METAR) and special weather reports (SPECI).

1.2.1 Aviation routine weather reports (METAR)

METAR is a routine weather report which is issued hourly or half-hourly intervals depending on airport operations. METARs are issued on a regular scheduled basis. For international airports are issued half hourly

while other airports are issued at hourly interval in order to facilitate the safe and efficient movement of air traffic.

1.2.2 Special weather reports (SPECI)

SPECI is non-routine weather reports, issued at any time when certain criteria as defined by ICAO or by local agreements are met [see Technical Regulations (WMO-No.49), Volume II, Part II, Appendix 3, section 2.3], but should fall outside the routine time of observation.
A SPECI will not be encoded if the change occurs within a period of ten minutes before the official time of observation unless the change occurs so close to the scheduled time of transmission so that it cannot be included in the normal observation.
A SPECI replace a METAR if there is a **significant change of weather** in either way of deterioration or significant improvement at the station (aerodrome) according to the recommended value of the changes.

1.3 Contents of METAR and SPECI

METAR and SPECI should contain the following information, as necessary, and normally in the order indicated:

(i) Identification of the type of report,

(ii) Report modifier, when applicable,

(iii) The ICAO location indicator of the reporting station,

(iv) The day of the month and the time of observation in hours and minutes,

(v) Identification of missing report or an automated, when applicable,

(vi) Surface wind direction and speed,

(vii) Visibility,

(viii) Runway visual range, when applicable,

(ix) Present weather,

(x) Cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds) and height of cloud base or, where measured, vertical visibility,

(xi) Air temperature and dew point temperature,

(xii) QNH and, when applicable, QFE (QFE included only in local routine and special reports),

(xiii) Supplementary Information (included in accordance with regional air navigation agreement).

SYMBOLIC (CODE) FORM

METAR or SPECI } COR CCCC YYGGggZ NIL AUTO ddd ff Gf$_m$f$_m$ { KT or MPS } $d_nd_nd_nVd_xd_xd_x$

VVVV or CAVOK $V_NV_NV_NV_NDv$ { $RD_RD_R/V_RV_RV_RV_{Ri}$ or $RD_RD_R/V_RV_RV_RV_RVV_RV_RV_RV_{Ri}$ } w′w′ { $N_sN_sN_sh_sh_sh_s$ or $Vh_sh_sh_s$ or SKC or NSC }

T′T′/T′$_d$T′$_d$ $QP_HP_HP_HP_H$ REw′w′ { WS RD_RD_R or WS ALL RWY } (WTsTs/SS′) ($RD_RD_R/E_RC_Re_Re_RB_RB_R$)

However this handbook will focus on common mistakes which recurs in Surface wind, Visibility and Present weather groups.

CHAPTER TWO 2

2.0 INTERPRETATION AND CODING SURFACE WIND, VISIBILITY AND PRESENT

WEATHER GROUPS

Proper coding and interpretation of meteorological parameters are necessary to provide relevant information for a specific airport. It has been found that common human mistakes are recurring in coding and reporting the aviation weather report. These mistakes in coding and reporting may lead to a serious impact on aviation operations. Therefore, this chapter will analyze the common mistakes performed and explain the correct way for coding and reporting, surface wind, visibility and present weather groups.

2.1 Surface Wind

The wind reported in METAR and SPECI should be the mean over the ten minutes preceding the observation. Normally this group has five-figures followed by an abbreviation to indicate the wind speed units used. The first three figures indicate the wind direction and the last two the wind speed. Example: **09020KT.** From observation, the most common challenging scenario is how to code variable wind and gust wind.

Note:

1.The surface wind direction and speed shall be reported in steps of 10° from true North and 1kt, respectively. Any observed value which does not fit the reporting scale in use shall be rounded to the nearest step in the scale. Value of wind direction ending with 1° to 5° shall be rounded down, and value of wind direction ending with 6° to 9° shall be rounded up. For example 152° will be reported as 150 and 286° will be reported as 290.

2. The standard ICAO abbreviation for reporting surface wind are KT or MPS.
3. The unit of wind speed used is determined by national decision.
4. The maximum wind (gust) is reported only if it exceeds the mean speed by 10 knots or more.

2.1.1 ICAO Standard

1. **Variable wind**
The wind direction is encoded as VRB only if one of the following conditions is met:

(a) When the mean wind speed is less than 3kt (1.5m/s).
For example the wind group will be coded as **VRB01KT or VRB02KT**.

(b) When wind speed is higher (3kt or more) and the variation of wind direction is 180° or more, and it is impossible to determine a single wind direction, for example when a thunderstorm is over the aerodrome. For example when the mean wind speed observed is 10kt this group will be coded as **VRB10KT**.

2. Gust wind
If, during the 10 minutes preceding the observation, the maximum gust speed has exceeded the mean speed by 10kt (5m/s) or more, this gust will be reported by inserting the letter G followed by the gust speed directly after the mean speed.

2.1.2 Common mistakes and corrections

The following are METARS with mistaken wind group coding and the correct coded report:

Wrong coded METAR Reports:

METAR HTMP 051400Z **36002KT** 9999 BKN028 FEW029CB 32/13 Q1014=

METAR HTMH 220600Z **15002KT** 9999 FEW018 BKN080 24/17=

METAR HTDA 220800Z **23002KT** 9999 SCT013 BKN015 30/25 Q1010 =

METAR HTSO 241900Z **10002KT** 9999 TS SCT016 FEW017CB 26/19 Q1016=

METAR HTSY 290300Z **27002KT** 9999 FEW017 FEW018CB BKN070 19/18 Q1017=

METAR HTGW 251300Z **09001KT** 9999 BKN026 FEW027CB 22/19 Q1016=

METAR HTMP 130700Z **VRB07KT** 9999 FEW018 BKN080 21/18 Q1020=

METAR HTZA 102300Z **VRB03KT** 9999 SCT011 SCT070 27/24 Q1009 NOSIG=

METAR HTGW 210500Z **VRB03KT** 9999 SCT023 20/11 Q1019 N0SIG=

METAR HTTB 010900Z **VRB03KT** 9999 FEW019 BKN070 25/17 Q1022 NOSIG=

METAR HTMW 131900Z **VRB03KT** 9999 FEW019 20/17 Q1017 NOSIG=

METAR HTAR 060600Z **310VRB02KT** 9999 BKN022 20/18 Q1024 NOSIG=

Note:

i. When the mean wind speed is less than 3kt (1kt or 2kt) report VRB.

ii. When the mean wind speed is higher (3kt or more) and the variation of wind direction is 180° or more, and it is impossible to determine a single wind direction, for example when a thunderstorm is over the aerodrome, also report VRB.

Correct coded METAR Reports

Possible scenarios;

METAR HTMP 051400Z VRB02KT 9999 BKN028 FEW029CB 32/13 Q1014=

METAR HTMH 220600Z VRB02KT 9999 FEW018 BKN080 24/17=

METAR HTDA 220800Z VRB02KT 9999 SCT013 BKN015 30/25 Q1010=

METAR HTSO 241900Z VRB02KT 9999 TS SCT016 FEW017CB 26/19 Q1016=

METAR HTSY 290300Z VRB02KT 9999 FEW017 FEW018CB BKN070 19/18 Q1017=

METAR HTGW 251300Z VRB01KT 9999 BKN026 FEW027CB 22/19 Q1016=

METAR HTMP 130700Z VRB07KT 9999 TS FEW018 ///CB BKN080 21/18 Q1020=

METAR HTZA 102300Z VRB03KT 9999 TS SCT011 ///CB SCT070 27/24 Q1009 NOSIG=

METAR HTGW 210500Z VRB03KT 9999 TS SCT023 ///CB 20/11 Q1019 N0SIG=

METAR HTTB 010900Z VRB03KT 9999 TS FEW019 ///CB BKN070 25/17 Q1022 NOSIG=

METAR HTMW 131900Z VRB03KT 9999 TS FEW019 ///CB 20/17 Q1017 NOSIG=

METAR HTAR 060600Z VRB02KT 9999 BKN022 20/18 Q1024 NOSIG=

Wrong coded METAR Reports

METAR HTPE 230400Z **16014G22KT** 5000 -RA SCT010 BKN060 24/24 Q1015 =

METAR HTGW 161400Z **17025G30KT** 9999 FEW026 19/07 Q1025=

Note:

If, during the 10 minutes preceding the observation, the maximum gust speed has exceeded the mean speed by 10kt (5m/s) or more, this gust will be reported by inserting the letter G followed by the gust speed directly after the mean speed.

Correct coded METAR Reports

Possible scenarios;

METAR HTPE 230400Z 16014G25KT 5000 -RA SCT010 BKN060 24/24 Q1015 =

METAR HTPE 230400Z 16014G30KT 5000 -RA SCT010 BKN060 24/24 Q1015 =

METAR HTPE 230400Z 16014KT 5000 -RA SCT010 BKN060 24/24 Q1015 =

METAR HTGW 161400Z 17025G35KT 9999 FEW026 19/07 Q1025=

METAR HTGW 161400Z 17025G40KT 9999 FEW026 19/07 Q1025=

METAR HTGW 161400Z 17025KT 9999 FEW026 19/07 Q1025=

2.2 Visibility

The coding of visibility is based on the use of the metre and kilometre, in accordance with the units specified in ICAO Annex 5.

2.2.1 ICAO Standard

1. The group VVVV shall be used to report prevailing visibility.

When visibility is the same in all directions, only the prevailing visibility is reported.

2. When the visibility is not the same in different directions and when visibility is fluctuating rapidly, and the prevailing visibility cannot be determined, only the minimum visibility should be reported, with no indication of direction. Example: Visibility of 4000m is encoded as 4000.

3. Directional variation in visibility

The minimum visibility and the prevailing visibility will be reported;

(i) When the visibility is not the same in different directions and is not fluctuating rapidly and when the minimum visibility is different from the prevailing visibility, and less than 1500m or

(ii) When the visibility is not the same in different directions and is not fluctuating rapidly and when the minimum visibility is different from the prevailing visibility and less than 50 percent of the prevailing visibility, and less than 5000m. In these cases, the minimum visibility observed will be reported first, followed by the prevailing visibility observed with its general direction in relation to the aerodrome reference point indicated by reference to one of the eight points of the compass. If the minimum visibility is observed in more than one direction, then the most operationally significant direction should be reported.

Example: 1200SW 4000 and 2000E 8000 respectively.

From observation, the most common challenges scenario is how to code directional visibility, minimum and maximum visibility and appending units to visibility group.

4. Minimum and maximum visibility with its general directions will be reported, when the minimum horizontal visibility is less than 1500m and the maximum horizontal visibility in another direction is greater than 5000m.

Example: 1200SW 6000N means that minimum visibility equals 1200m to the south-west and maximum visibility equals to 6km to the north.

If the maximum visibility is observed in more than one direction, then the most operationally significant direction is reported.

Note:
Visibility is weather dependent; therefore, different weather phenomena affect visibility differently.

5. The reporting scales of visibility are as follows

(i) In steps of 50m if VVVV is less than 800m;

(ii) In steps of 100m if VVVV is 800m or more, but less than 5km;

(iii) In steps of 1000m if VVVV is 5km or more, but less than 10km;

(iv) As 9999 when visibility is 10km or more.

All observed values are to be rounded down to the nearest lower step in the scale.

2.2.2 Common mistakes and corrections

The following are METARS with mistaken visibility coding and the correct coded report:

Wrong coded METAR Reports

METAR HTIR 032300Z 00000KT 9000**M** -RA BKN017 FEW018CB BKN070 19/18 Q1021 =

METAR HTDA 101500Z 26011KT 6000**M** TSRA SCT014 FEW018CB BKN080 25/24 Q1008=

METAR HTPE 170300Z 00000KT 9000**M** RA SCT017 FEW019CB BKN070 27/26 Q1010 =

METAR HTIR 170400Z 00000KT 8000**M** RA BKN016 FEW017CB OVC070 18/17 Q1020=

METAR HTKI 110900Z 09004KT 6000**M** RA SCT020 FEW022CB SCT280 28/27 Q1012=

METAR HTIB 020500Z 00000KT 200**M** FG FEW016 FEW017CB 18/18 Q1018=

METAR HTMS 070800Z 29008KT 8000**M** TSRA BKN022 FEW024CB OVC080 21/20 Q1018=

Note: Visibility encoding in a METAR/SPECI shall be unitless.

Correct coded METAR Reports

METAR HTIR 032300Z 00000KT 9000 -RA BKN017 FEW018CB BKN070 19/18 Q1021 =

METAR HTDA 101500Z 26011KT 6000 TSRA SCT014 FEW018CB BKN080 25/24 Q1008=

METAR HTPE 170300Z 00000KT 9000 RA SCT017 FEW019CB BKN070 27/26 Q1010 =

METAR HTIR 170400Z 00000KT 8000 RA BKN016 FEW017CB OVC070 18/17 Q1020=

METAR HTKI 110900Z 09004KT 6000 RA SCT020 FEW022CB SCT280 28/27 Q1012=

METAR HTMS 070800Z 29008KT 8000 TSRA BKN022 FEW024CB OVC080 21/20 Q1018=

METAR HTIB 020500Z 00000KT 0200 FG FEW016 FEW017CB 18/18 Q1018=

Wrong coded METAR Report

METAR HTMU 152000Z 00000KT **9999** +RA BKN020 FEW022CB BKN080 23/18 Q1017=

Note: Heavy rain can reduce visibility to below 5km.

Correct coded METAR Reports

Possible scenarios;

METAR HTMU 152000Z 00000KT 4000 +RA BKN020 FEW022CB BKN080 23/18 Q1017=

METAR HTMU 152000Z 00000KT 3000 +RA BKN020 FEW022CB BKN080 23/18 Q1017=

METAR HTMU 152000Z 00000KT 2000 +RA BKN020 FEW022CB BKN080 23/18 Q1017=

METAR HTMU 152000Z 00000KT 0800 +RA BKN020 FEW022CB BKN080 23/18 Q1017=

Wrong coded METAR Reports

METAR HTDA 021600Z 15005KT **5000 2000** RA BR SCT011 FEW014CB BKN070 24/23 Q1013 NOSIG=

METAR HTDA 210300Z 00000KT **4000 300SE 500SW FG** SCT011 20/19 Q1014=

METAR HTDA 240900Z 19006KT 9999 **1000SW 2000SE** TSRA SCT010 BKN012 FEW013CB 24/24 Q1013=

METAR HTAR 261100Z **9000NW** VCSH BKN030 FEW032CB 24/18 Q1018 RESHRA=

METAR HTDA 210300Z 00000KT **300SE** FG SCT011 20/19 Q1014=

Note:

i. When FG is reported, visibility shall be less than 1000m, except when qualified by "MI", "BC", "PR" or "VC.

ii. The values less than 1000 metres are written after 1 or 2 zeros.

iii. Visibility is reported in metres up to 9000m and in four (4) digits, but when coded unit shall not be indicated.

iv. Visibility of less than 50m shall be coded as '0000'.

Correct coded METAR Reports

Possible scenarios;

METAR HTDA 021600Z 15005KT 1000NE 4000 RA BR SCT011 FEW014CB BKN070 24/23 Q1013 NOSIG=

METAR HTDA 021600Z 15005KT 1200NE 3000 RA BR SCT011 FEW014CB BKN070 24/23 Q1013 NOSIG=

METAR HTDA 210300Z 00000KT 0300 FG SCT011 20/19 Q1014=

METAR HTDA 210300Z 00000KT 1000SW 4000 MIFG SCT011 20/19 Q1014=

METAR HTDA 210300Z 00000KT 1000SW 4000 BCFG SCT011 20/19 Q1014=

METAR HTDA 210300Z 00000KT 1000SW 4000 PRFG SCT011 20/19 Q1014=

METAR HTDA 240900Z 19006KT 9999 1000SW 3000 TSRA SCT010 BKN012 FEW013CB 24/24 Q1013=

METAR HTDA 240900Z 19006KT 9999 1000SW 6000SE TSRA SCT010 BKN012 FEW013CB 24/24 Q1013=

METAR HTAR 261100Z 9000 VCSH BKN030 FEW032CB 24/18 Q1018 RESHRA=

METAR HTDA 210300Z 00000KT 0300 FG SCT011 20/19 Q1014=

2.3 Present Weather

The following weather phenomena are considered to be significant for aircraft operations precipitation (rain, drizzle or snow), obscuration (fog, haze or mist) and thunderstorms.

2.3.1 ICAO Standard

1. Present weather phenomena are reported in terms of types and characteristics and are qualified with respect to intensity or proximity to the aerodrome, as appropriate. The appropriate notations found in Table 4678 shall be used to code present weather.

Table 1: Notations of Reporting Present Weather (Manual on Codes, WMO-306-code table 4678)

QUALIFER				WEATHER PHENOMENA					
Intensity or Proximity		Descriptor		Precipitation		Obscuration		Other	
1		2		3		4		5	
-	Light	**MI**	Shallow	**DZ**	Drizzle	**BR**	Mist	**PO**	Well-developed Dust/Sand Whirls (dust devils)
	Moderate (No qualifier)	**PR**	Partial	**RA**	Rain	**FG**	Fog		
+	Heavy	**BC**	Patches	**SN**	Snow	**FU**	Smoke	**SQ**	Squalls
VC	In the vicinity	**DR**	Low drifting	**SG**	Snow grains	**VA**	Volcanic ash	**FC**	Funnel cloud(s) (tornado or waterspout)
		BL	Blowing	**PL**	Ice Pellets	**DU**	Widespread dust		
		SH	Shower(s)	**GR**	Hail	**SA**	Sand	**SS**	Sandstorm
		TS	Thunderstorm	**GS**	Small hail and/or snow pellets	**HZ**	Haze	**DS**	Duststorm
		FZ	Freezing	**UP**	Unknown Precipitation	**PY**	Spray		

The weather phenomena belong to three main categories which are precipitation, obscuration and other. Once it has been decided there is a weather phenomenon to be reported, the present weather is encoded by considering columns 1 to 5 in the table 4678 above in sequence, that is intensity or proximity, followed by description, followed by precipitation, obscuration and other phenomena).

Example:

There is rain: RA
It is heavy: +
It is a shower: SH

The encode becomes +SHRA [shower(s) of heavy rain].

2. Coding of Present Weather Group(s)

No more than three weather groups shall be used to report phenomena at or near the station.

If more than one significant weather phenomena is observed, they shall be reported in separate groups. However, if more than one types of precipitation are observed at the time of observation, shall be reported as one single group with the dominant type of precipitation being reported first and preceded by only one intensity qualifier which refers to the intensity of the total precipitation.

A maximum of three types of precipitation shall be combined in a single present weather group.

In such a single group, precipitation with greatest intensity is reported first and then follows precipitation with lesser intensity, e.g. **RADZ, +SHRASN**.

The same is true if there is more than one type of obscuration, they are entered in the order of dominance. An obscuration that is coded with another present weather group(s) is separated from it by a space. Example: **-TSRA BR**, **TS SHRA FG**.

2.3.2 Common mistakes and corrections

The following are METARS with mistaken weather group coding and the correct coded report:

Wrong coded METAR Reports

METAR HTMH 040300Z 09008KT 1000 **FG** FEW005 BKN015 19/18=

METAR HTSE 240300Z 00000KT 3000 **FG** BKN019 20/20=

METAR HTDA 260300Z 00000KT 1000 **FG** FEW010 25/24 Q1009=

METAR HTAR 280400Z 00000KT 1000 **FG** SCT008 OVC018 18/18 Q1020=

METAR HTIB 080400Z 00000KT 8000 **FG** FEW014 FEW015CB SCT070 17/17 Q1016=

METAR HTSU 130400Z 00000KT 8000 **-FG** FEW016 SCT080 16/15 Q1023=

METAR HTAR 160400Z 12006KT 2000 **-FG** SCT006 BKN016 14/13 Q1022=

METAR HTMH 160400Z 00000KT 0050 **+FG** VV001 20/19 Q1025=

METAR HTAR 242100Z 00000KT 0200 **MIFG** BKN018 18/18 Q1018=

METAR HTMH 261700Z 18007KT 1000 **TS FG** BKN003 21/21=

METAR HTDA 220500Z 23005KT 6000 **MIFG** FEW012 SCT070 **24/21** Q1018 NOSIG=

METAR HTMW 042200Z 13005KT 9000 **MIFG** FEW020 **18/08** Q1017 NOSIG=

METAR HTAR 070800Z 12007KT 9000 **MIFG** FEW009 BKN018 **18/15** Q1025 NOSIG=

METAR HTMW 290400Z 11003KT 8000 **HZ** FEW018 FEW019CB SCT080 **18/18** Q1017 NOSIG=

METAR HTAR 250500Z 09005KT 5000 **BR** FEW006 OVC018 **16/16** Q1024 NOSIG=

Note:

i. Descriptors are qualifiers which further describe weather phenomena and are used with certain types of precipitation and obscurations. The descriptor qualifiers are:
Shallow, partial, patches, low drifting, blowing, shower(s), thunderstorm and freezing.

ii. FG is reported when visibility is less than 1000m, except when qualified by "MI", "BC", "PR" or "VC".

iii. The descriptor MI (shallow) is used only with fog (FG) when the observed horizontal visibility is 1000 m or more, but when fog is less than 2m (6ft) above ground lever.

iv. Mist is reported when visibility is at least 1000m but not more than 5000m.

v. Fog forms when the difference between dew point and air temperature is less than 2.5 degrees Celsius. Relative humidity in fog is generally 100 percent.

vi. When visibility is above 5 km, the phenomena FU, HZ, DU, SA and BR are not present by definition and are therefore not reported.

vii. All obscurations are always reported without intensity qualifiers.

Correct coded METAR Reports

Possible scenarios;

METAR HTMH 040300Z 09008KT 0900 FG FEW005 BKN015 19/18=

METAR HTMH 040300Z 09008KT 1000 MIFG FEW005 BKN015 19/18=

METAR HTMH 040300Z 09008KT 1000 PRFG FEW005 BKN015 19/18=

METAR HTMH 040300Z 09008KT 1000 BCFG FEW005 BKN015 19/18=

METAR HTMH 040300Z 09008KT 1000 BR FEW005 BKN015 19/18=

METAR HTSE 240300Z 00000KT 0800 FG BKN019 20/20=

METAR HTSE 240300Z 00000KT 3000 MIFG BKN019 20/20=

METAR HTSE 240300Z 00000KT 3000 PRG BKN019 20/20=

METAR HTSE 240300Z 00000KT 3000 BCFG BKN019 20/20=

METAR HTDA 260300Z 00000KT 0700 FG FEW010 25/24 Q1009=

METAR HTDA 260300Z 00000KT 1000 MIFG FEW010 25/24 Q1009=

METAR HTDA 260300Z 00000KT 1000 PRFG FEW010 25/24 Q1009=

METAR HTDA 260300Z 00000KT 1000 BCFG FEW010 25/24 Q1009=

METAR HTDA 260300Z 00000KT 1000 BR FEW010 25/24 Q1009=

METAR HTAR 280400Z 00000KT 0600 FG SCT008 OVC018 18/18 Q1020=

METAR HTAR 280400Z 00000KT 1000 MIFG SCT008 OVC018 18/18 Q1020=

METAR HTAR 280400Z 00000KT 1000 PRFG SCT008 OVC018 18/18 Q1020=

METAR HTAR 280400Z 00000KT 1000 BCFG SCT008 OVC018 18/18 Q1020=

METAR HTIB 080400Z 00000KT 0500 FG FEW014 FEW015CB SCT070 17/17 Q1016=

METAR HTIB 080400Z 00000KT 8000 MIFG FEW014 FEW015CB SCT070 17/17 Q1016=

METAR HTIB 080400Z 00000KT 8000 PRFG FEW014 FEW015CB SCT070 17/17 Q1016=

METAR HTIB 080400Z 00000KT 8000 BCFG FEW014 FEW015CB SCT070 17/17 Q1016=

METAR HTSU 130400Z 00000KT 0700 FG FEW016 SCT080 16/15 Q1023=

METAR HTSU 130400Z 00000KT 8000 MIFG FEW016 SCT080 16/15 Q1023=

METAR HTSU 130400Z 00000KT 8000 PRFG FEW016 SCT080 16/15 Q1023=

METAR HTSU 130400Z 00000KT 8000 BCFG FEW016 SCT080 16/15 Q1023=

METAR HTAR 160400Z 12006KT 0200 FG SCT006 BKN016 14/13 Q1022=

METAR HTAR 160400Z 12006KT 2000 MIFG SCT006 BKN016 14/13 Q1022=

METAR HTAR 160400Z 12006KT 2000 PRFG SCT006 BKN016 14/13 Q1022=

METAR HTAR 160400Z 12006KT 2000 BCFG SCT006 BKN016 14/13 Q1022=

METAR HTMH 160400Z 00000KT 0050 FG VV001 20/19 Q1025=

METAR HTAR 242100Z 00000KT 0200 FG BKN018 18/18 Q1018=

METAR HTMH 261700Z 18007KT 1000 TS MIFG BKN003 ///CB 21/21=

METAR HTMH 261700Z 18007KT 1000 TS PRFG BKN003 ///CB 21/21=

METAR HTMH 261700Z 18007KT 1000 TS BCFG BKN003 ///CB 21/21=

METAR HTMH 261700Z 18007KT 0700 TS FG BKN003 ///CB 21/21=

METAR HTDA 220500Z 23005KT 6000 FEW012 SCT070 24/21 Q1018 NOSIG=

METAR HTMW 042200Z 13005KT 9000 FEW020 18/08 Q1017 NOSIG=

METAR HTAR 070800Z 12007KT 9000 FEW009 BKN018 18/15 Q1025 NOSIG=

METAR HTMW 290400Z 11003KT 8000 MIFG FEW018 FEW019CB SCT080 18/18 Q1017=

METAR HTMW 290400Z 11003KT 8000 BCFG FEW018 FEW019CB SCT080 18/18 Q1017=

METAR HTMW 290400Z 11003KT 8000 PRFG FEW018 FEW019CB SCT080 18/18 Q1017=

METAR HTAR 250500Z 09005KT 5000 MIFG FEW006 OVC018 16/16 Q1024 NOSIG=

METAR HTAR 250500Z 09005KT 5000 BCFG FEW006 OVC018 16/16 Q1024 NOSIG=

METAR HTAR 250500Z 09005KT 5000 PRFG FEW006 OVC018 16/16 Q1024 NOSIG=

Wrong coded METAR Reports

METAR HTKB 100500Z 15004KT 9999 **-TS** SCT020 FEW021CB BKN070 26/24=

METAR HTMT 051000Z 12012KT 9999 **-TS** BKN023 FEW024CB 29/25 Q1012=

METAR HTPE 120800Z 07008KT 9999 **-TS** SCT019 FEW021CB 32/26 Q1013=

METAR HTMG 021900Z 00000KT 9999 **-TS** BKN025 FEW028CB 26/20 Q1013=

METAR HTDA 051000Z 15010KT 8000 **-TS** VCSH BKN018 FEW023 31/24 Q1012=

METAR HTIR 021200Z 00000KT 9999 **-TS** BKN024 FEW026CB BKN080 20/18 Q1018=

METAR HTMH 271800Z 12008KT 9999 **+TS** BKN015 FEW016CB 22/20 Q1025=

Note:

i. Although thunderstorm (TS) is categorized as a descriptor it can be used (treated) as a weather phenomenon on its own. Remember, a thunderstorm can occur without precipitation; it is the only descriptor that can be treated as present weather and may be reported without precipitation.

ii. When descriptor **TS** is reported alone will never be used with intensity symbols.

Correct coded METAR Reports

Possible scenarios;

METAR HTKB 100500Z 15004KT 9999 TS SCT020 FEW021CB BKN070 26/24=

METAR HTKB 100500Z 15004KT 9999 VCTS SCT020 FEW021CB BKN070 26/24=

METAR HTMT 051000Z 12012KT 9999 TS BKN023 FEW024CB 29/25 Q1012=

METAR HTMT 051000Z 12012KT 9999 VCTS BKN023 FEW024CB 29/25 Q1012=

METAR HTPE 120800Z 07008KT 9999 TS SCT019 FEW021CB 32/26 Q1013=

METAR HTPE 120800Z 07008KT 9999 VCTS SCT019 FEW021CB 32/26 Q1013=

METAR HTMG 021900Z 00000KT 9999 TS BKN025 FEW028CB 26/20 Q1013=

METAR HTMG 021900Z 00000KT 9999 VCTS BKN025 FEW028CB 26/20 Q1013=

METAR HTDA 051000Z 15010KT 8000 TS VCSH BKN018 FEW023 31/24 Q1012=

METAR HTIR 021200Z 00000KT 9999 TS BKN024 FEW026CB BKN080 20/18 Q1018=

METAR HTIR 021200Z 00000KT 9999 VCTS BKN024 FEW026CB BKN080 20/18 Q1018=

METAR HTMH 271800Z 12008KT 9999 TS BKN015 FEW016CB 22/20 Q1025=

METAR HTMH 271800Z 12008KT 9999 VCTS BKN015 FEW016CB 22/20 Q1025=

Wrong coded METAR Reports

METAR HTPE 210200Z 00000KT 9999 **LT to S** SCT014 FEW016CB 25/24 Q1010=

METAR HTMP 260300Z 00000KT 9999 **LT** FEW017 FEW019CB BKN070 19/18 Q1018=

METAR HTSU 262200Z 00000KT 9999 **LT** FEW016 FEW018CB 16/15 Q1023=

METAR HTZA 232200Z 19008KT 9999 **LT TO N** FEW016 FEW018CB 27/23 Q1011=

METAR HTTG 131900Z 09006KT 9999 **LT** BKN020 FEW021CB 28/24 Q1012=

METAR HTMH 251800Z 00000KT 9999 **LT** BKN015 FEW017CB 21/19 Q1027=

Note:

The qualifier **TS** shall be used whenever thunder is heard or lightning detected at the aerodrome within the 10-minute period preceding the observation, or encoded as **VCTS** when it is at the vicinity.

Correct coded METAR Reports

Possible scenarios;

METAR HTPE 210200Z 00000KT 9999 TS SCT014 FEW016CB 25/24 Q1010=

METAR HTPE 210200Z 00000KT 9999 VCTS SCT014 FEW016CB 25/24 Q1010=

METAR HTMP 260300Z 00000KT 9999 TS FEW017 FEW019CB BKN070 19/18 Q1018=

METAR HTMP 260300Z 00000KT 9999 VCTS FEW017 FEW019CB BKN070 19/18 Q1018=

METAR HTSU 262200Z 00000KT 9999 TS FEW016 FEW018CB 16/15 Q1023=

METAR HTSU 262200Z 00000KT 9999 VCTS FEW016 FEW018CB 16/15 Q1023=

METAR HTZA 232200Z 19008KT 9999 TS FEW016 FEW018CB 27/23 Q1011=

METAR HTZA 232200Z 19008KT 9999 VCTS FEW016 FEW018CB 27/23 Q1011=

METAR HTTG 131900Z 09006KT 9999 TS BKN020 FEW021CB 28/24 Q1012=

METAR HTTG 131900Z 09006KT 9999 VCTS BKN020 FEW021CB 28/24 Q1012=

METAR HTMH 251800Z 00000KT 9999 TS BKN015 FEW017CB 21/19 Q1027=

METAR HTMH 251800Z 00000KT 9999 VCTS BKN015 FEW017CB 21/19 Q1027=

Wrong coded METAR Reports

METAR HTKI 210600Z 09011KT 9999 **-SH** SCT022 FEW023CB BKN080 30/25 Q////=

METAR HTZA 222100Z 19006KT 9999 **SH** SCT010 26/25 Q1012=

METAR HTKB 051000Z 00000KT 9999 **SH** BKN024 FEW025CB 30/24 Q1012=

METAR HTSU 271000Z 09008KT 9999 **-SH** FEW022 FEW025CB 24/16 Q1019=

METAR HTMT 161000Z 09007KT 9999 **SH** BKN023 FEW024CB 30/25 Q1008=

Note:

The qualifier **SH** is a descriptor that is used to further describe the precipitation and not part of the weather phenomena category, therefore shall not be reported alone.

The descriptor shower(s) (SH) shall be coded only with one or more of rain (RA), snow (SN), large hail (GR) and small hail (GS), for example SHRA, SHSN, SHGR and SHGS.

Correct coded METAR Reports

METAR HTKI 210600Z 09011KT 9999 -SHRA SCT022 FEW023CB BKN080 30/25 Q////=

METAR HTZA 222100Z 19006KT 9999 SHRA SCT010 26/25 Q1012=

METAR HTKB 051000Z 00000KT 9999 SHRA BKN024 FEW025CB 30/24 Q1012=

METAR HTSU 271000Z 09008KT 9999 -SHRA FEW022 FEW025CB 24/16 Q1019=

METAR HTMT 161000Z 09007KT 9999 SHRA BKN023 FEW024CB 30/25 Q1008=

Wrong coded METAR Reports

METAR HTAR 201300Z 08008KT 9999 **VCSHRA** FEW038 FEW040 24/18 Q1014=

METAR HTHA 230700Z 00000KT **2000** **VCRA** FEW007 SCT018 BKN080 23/22 Q////=

METAR HTMP 161400Z 07008KT 9999 **VCSHRA** BKN025 FEW027CB 29/19 Q1012=

METAR HTKA 272200Z 33018KT 9999 **VCTSRA** SCT020 FEW021CB BKN080 22/19 1017=

METAR HTSU 101600Z 35005KT 9999 **VCRA** BKN020 FEW022CB 20/14 Q1021=

METAR HTBU 090900Z 09015KT 8000 **VCRA** SCT011 FEW013CB BKN080 20/18 Q1019=

METAR HTMG 241600Z 00000KT 9999 **VCSHTS** BKN025 FEW026CB 27/22 Q1011=

METAR HTZA 070800Z 00000KT **7000** **TSVCSH** FEW007 BKN009 FEW012CB 26/25 Q1014=

Note:

i. Proximity indicator **VC** is used when weather phenomena is between approximately 8 and 16km of the aerodrome reference point.

ii. Any type of precipitation not occurring at the point of observation, but between approximately **8km** and **16km** shall be coded as showers in the vicinity (**VCSH**). Precipitation when associated with the indicator VC, the type and intensity of the precipitation shall not be specified.

iii. When it precipitates and visibility is reduced to 2000m possibly it could have been rain or combination of rain and drizzle at the aerodrome (station).

iv. Precipitation type and intensity are not indicated when reporting **VCTS**.

v. In a METAR/SPECI reports, when TS is accompanied with VCSH, TS shall be reported as present weather because it is more significant in aviation.

vi. Although thunderstorm (TS) is categorized as a descriptor it can be used (treated) as a weather phenomenon on its own. Remember, a thunderstorm can occur without precipitation; it is the only descriptor that can be treated as present weather and may be reported without Precipitation.

Correct coded METAR Reports

Possible scenarios;

METAR HTHA 230700Z 00000KT 9999 VCSH FEW007 SCT018 BKN080 23/22 Q////=

METAR HTHA 230700Z 00000KT 2000 RADZ FEW007 SCT018 BKN080 23/22 Q////=

METAR HTHA 230700Z 00000KT 2000 DZ FEW007 SCT018 BKN080 23/22 Q////

METAR HTMP 161400Z 07008KT 9999 VCSH BKN025 FEW027CB 29/19 Q1012=

METAR HTKA 272200Z 33018KT 9999 VCTS SCT020 FEW021CB BKN080 22/19 Q1017=

METAR HTSU 101600Z 35005KT 9999 VCSH BKN020 FEW022CB 20/14 Q1021=

METAR HTBU 090900Z 09015KT 8000 VCSH SCT011 FEW013CB BKN080 20/18 Q1019=

METAR HTMG 241600Z 00000KT 9999 VCTS BKN025 FEW026CB 27/22 Q1011=

METAR HTMG 241600Z 00000KT 9999 TS VCSH BKN025 FEW026CB 27/22 Q1011=

METAR HTZA 070800Z 00000KT 7000 TSDZ FEW007 BKN009 FEW012CB 26/25 Q1014 =

METAR HTZA 070800Z 00000KT 8000 TS VCSH FEW007 BKN010 FEW012CB 26/25 Q1014=

Wrong coded METAR Reports

METAR HTAR 231400Z 03006KT 7000 **TS/SHRA** FEW022CB BKN023 22/20 Q1013=

METAR HTAR 251500Z 35012KT 4000 **TSRASH** FEW007 FEW024CB BKN026 BKN070 19/16 Q1016=

METAR HTKA 240800Z 00000KT 9999 **-TSSHRA** FEW018 FEW019CB 21/19 Q1018=

METAR HTSU 231400Z 04018KT 9999 **+TSSHRA** BKN020 FEW022CB 17/14 Q1020=

METAR HTSI 081500Z 17006KT 9999 **TSSHRA** BKN022 FEW023CB 23/15 Q1016=

Note:

i. Only one descriptor shall be coded for each weather phenomena group. It is important to note that thunderstorm (**TS**) and shower (**SH**) are **descriptors** of the precipitation rather than a part of the weather phenomena category. Therefore, you will never see **"TS"** and **"SH"** in the same group reported at the same time as **"-TSSHRA"**. This does not mean that shower does not occur when thunderstorms are reported. Also the shower qualifier is not used in case of freezing precipitation.

ii. When thunderstorm is accompanied by showers of rain, it shall be encoded as TS SHRA.

Correct coded METAR Reports

Possible scenarios;

METAR HTAR 231400Z 03006KT 7000 TSRA FEW022CB BKN023 22/20 Q1013=

METAR HTAR 231400Z 03006KT 7000 TS SHRA FEW022CB BKN023 22/20 Q1013=

METAR HTAR 251500Z 35012KT 4000 TSRA FEW007 FEW024CB BKN026 BKN070 19/16

Q1016=

METAR HTAR 251500Z 35012KT 4000 TS SHRA FEW007 FEW024CB BKN026 BKN070 19/16 Q1016=

METAR HTKA 240800Z 00000KT 9999 -TSRA FEW018 FEW019CB 21/19 Q1018=

METAR HTKA 240800Z 00000KT 9999 TS -SHRA FEW018 FEW019CB 21/19 Q1018=

METAR HTSU 231400Z 04018KT 4000 +TSRA BKN020 FEW022CB 17/14 Q1020=

METAR HTSU 231400Z 04018KT 3000 +TSRA BKN020 FEW022CB 17/14 Q1020=

METAR HTSU 231400Z 04018KT 9999 TS -SHRA BKN020 FEW022CB 17/14 Q1020=

METAR HTSI 081500Z 17006KT 9999 TSRA BKN022 FEW023CB 23/15 Q1016=

METAR HTSI 081500Z 17006KT 9999 TS SHRA BKN022 FEW023CB 23/15 Q1016=

Wrong coded METAR Reports

METAR HTMH 221400Z 00000KT 0900 **-TSDZFG** BKN004 BKN019 21/20=

METAR HTMH 140800Z 07006KT 0500 **-TSRAFG** OVC002 20/20=

METAR HTDA 130700Z 00000KT 9000 **-RAMIFG** BKN010 FEW013CB BKN070 26/25 Q1012=

METAR HTMH 190600Z 00000KT 1000 **RAFG** FEW005 SCT017 BKN080 21/21=

METAR HTDA 072300Z 00000KT 4000 **SHFG** FEW010 FEW014CB 26/25 Q1012=

Note:

i. FG is reported when visibility is less than 1000 m, except when qualified by "MI", "BC", "PR" or "VC".

ii. Showers (SH) is a descriptor that is used to further describe the precipitation, often short-lived and sometimes heavy, falling from convective clouds, can't be used to describe fog.

iii. Thunderstorms originates from Cumulonimbus (CB) clouds, therefore when thunderstorm is reported, cumulonimbus cloud must be present.

iv. Any obscuration occurring simultaneously with one or more types of precipitation is reported in a separate groups, precipitation being reported first, then follows obscurations and are entered in order of dominance.

Correct coded METAR Reports

Possible scenarios;

METAR HTMH 221400Z 00000KT 0900 TSRADZ FG BKN004 ///CB BKN019 21/20=

METAR HTMH 140800Z 07006KT 0500 TSDZ FG OVC002 ///CB 20/20=

METAR HTDA 130700Z 00000KT 9000 -RA MIFG BKN010 FEW013CB BKN070 26/25 Q1012=

METAR HTDA 130700Z 00000KT 9000 -RA PRFG BKN010 FEW013CB BKN070 26/25 Q1012=

METAR HTDA 130700Z 00000KT 9000 -RA BCFG BKN010 FEW013CB BKN070 26/25 Q1012=

METAR HTMH 190600Z 00000KT 1000 RA MIFG FEW005 SCT017 BKN080 21/21=

METAR HTMH 190600Z 00000KT 1000 RA PRFG FEW005 SCT017 BKN080 21/21=

METAR HTMH 190600Z 00000KT 1000 RA BCFG FEW005 SCT017 BKN080 21/21=

METAR HTMH 190600Z 00000KT 0900 RA FG FEW005 SCT017 BKN080 21/21=

METAR HTDA 072300Z 00000KT 4000 MIFG FEW010 FEW014CB 26/25 Q1012=

METAR HTDA 072300Z 00000KT 4000 PRFG FEW010 FEW014CB 26/25 Q1012=

METAR HTDA 072300Z 00000KT 4000 BCFG FEW010 FEW014CB 26/25 Q1012=

Wrong coded METAR Reports

METAR HTBU 080600Z 00000KT **5000** TS SCT022 FEW**013**CB BKN080 21/18 Q1020=

METAR HTKA 030800Z 36005KT 6000 **BR** SCT021 FEW022CB BKN080 24/19 Q1019=

Note:

i. Thunderstorm (TS) can't reduce visibility unless accompanied by precipitation or obscuration.

ii. Mist is reported when visibility is reduced by water droplets to 1000 to 5000m.

iii. When visibility is 5000m or less, one of the phenomena FU, HZ, DU, SA and BR is reported in the METAR/SPECI.

iv. When visibility is above 5000m, the phenomena FU, HZ, DU, SA or BR are not present by definition and are therefore not reported.

Correct coded METAR Reports

Possible scenarios;

METAR HTBU 080600Z 00000KT 5000 TSRA SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTBU 080600Z 00000KT 5000 TS FU SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTBU 080600Z 00000KT 5000 TS HZ SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTBU 080600Z 00000KT 5000 TS DU SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTBU 080600Z 00000KT 5000 TS SA SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTBU 080600Z 00000KT 5000 TS BR SCT022 FEW023CB BKN080 21/18 Q1020=

METAR HTKA 030800Z 36005KT 6000 SCT021 FEW022CB BKN080 24/19 Q1019=

METAR HTKA 030800Z 36005KT 5000 BR SCT021 FEW022CB BKN080 24/19 Q1019=

METAR HTKA 030800Z 36005KT 4000 BR SCT021 FEW022CB BKN080 24/19 Q1019=

METAR HTKA 030800Z 36005KT 3000 BR SCT021 FEW022CB BKN080 24/19 Q1019=

METAR HTKA 030800Z 36005KT 2000 BR SCT021 FEW022CB BKN080 24/19 Q1019=

METAR HTKA 030800Z 36005KT 1000 BR SCT021 FEW022CB BKN080 24/19 Q1019=

2.4 Additional essential information

2.4.1. Intensity description

- If the intensity of the phenomena reported in the group is either light or heavy, this shall be indicated by the appropriate sign as (-) and (+) respectively.
- No indicator shall be included in the group when the intensity of the reported phenomenon is moderate.
- The intensity of present weather phenomena reported in the group w' w' shall be determined by the intensity at the time of observation.
- Light intensity should be indicated only for precipitation.

2.4.2 Precipitation Intensity Criteria

PRECIPITATION	INTENSITY	RATE	REDUCTION OF VISIBILITY
Drizzle	Light	Rate < 0.1mm/h	Generally, reduces visibility, but not to less than 5km
	Moderate	0.1 ≤ rate < 0.5mm/h	Generally, reduces visibility to between 1000m and 5km
	Heavy	Rate ≥ 0.5mm/h	Generally, reduces visibility to below 1000m
Rain (including showers)	Light	Rate < 2.5mm/h	Light rain can reduce visibility, but generally not to less than 10km.
			Light showers can reduce visibility to 5 to 10km.
	Moderate	2.5 ≤ rate <10.0mm/h	Moderate rain can reduce visibility to 5 to 10km. Moderate showers can reduce visibility to below 5km.
	Heavy	Rate ≥ 10.0mm/h	Heavy rain can reduce visibility to below 5km. Heavy showers can reduce visibility to 1000m
Snow (including showers)	Light	Rate < 1.0mm/h (liquid water equivalent)	Generally, reduces visibility, but to no less than 1000m
	Moderate	1.0 ≤ rate < 5.0mm/h (liquid water equivalent)	Generally, reduces visibility to between 400 and 1000m
	Heavy	Rate ≥ 5.0mm/h (liquid water equivalent	Generally, reduces visibility to below 400m

Note:

Drizzle is usually more effective in reducing the visibility than rain; this is because of the greater number of drops in each volume of air. That is to say, the smaller the droplet size the poorer the visibility. Reductions in visibility will be greatest in very heavy rain and in drizzle.

Table 2: Summary of present weather code

Present weather reported with intensity	Present weather reported without intensity	Present weather that may be reported between approximately 8 and 16km from the aerodrome reference point
- or +		VC
DZ, RA, SN, SG, PL, DS, SS, TSRA, TSSN, TSPL, SHRA, SHSN, SHPL, FZRA and FZDZ	TS, GR,GS, IC, FG, BR, HZ, SA, DU, FU, VA, SQ, TSGR, SHGR, SHSG, FZFG, BLDU, BLSA, BLSN, MIFG, BCFG, and PRFG	TS, SH, DS, SS, FG, FC, PO, BLDU, BLSA, BLSN and VA
+FC		

CONCLUSION 3

If this handbook will be used effectively by meteorological experts and students undertaking Technical Certificate in Meteorology, it is anticipated that those nonstandard reports in reporting wind, visibility and weather groups will be overcome.

ATTACHMENT A: OPERATIONALLY DESIRABLE ACCURACY OF MEASUREMENT OR OBSERVATION

Element to be observed	**Operational desirable accuracy of measurement or observation***
Mean surface wind	Direction: ± 10° Speed: ± 0.5m/s (1kt) up to 5m/s (10kt) ± 10% above 5m/s (10kt)
Variations from the mean surface wind	± 1m/s (2kt), in terms of longitudinal and lateral components
Visibility	± 50m up to 600m ± 10% between 600m and 1500m ± 20% above 1500m

* The operationally on the uncertainties accuracy is not intended as an operational requirement; it is to be understood as a goal that has been expressed by the operators.

Note:

Guidance on the uncertainties of measurement or observation can be found in the Guide to Meteorological Instruments and Methods of Observation (WMO – No.8)

REFERENCES 4

- Annex 3 to the Convention on International Civil Aviation (Twentieth Edition, July 2018).
- WMO – NO.782 (Aerodrome Reports and Forecasts - A Users' Handbook to the Codes – 2014 Edition and 2022 Edition).
- WMO – No.306 (Manual on codes Volume I.1 – 2011 edition, updated in 2016).
- METAR/SPECI Coding Study Guide.
- Technical Regulations Volume II (WMO – No.49 – 2018 edition, updated in 2021).
- Training Guide in Surface Weather Observations (May1998).


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