

CHAPTER 20

METAR CODE

WMO code FM 15-IX EXT. METAR – Aviation routine weather report (with or without trend forecast).

WMO code FM 16-IX Ext. SPECI – Aviation selected special weather report (with or without trend forecast).

$$\left\{ \begin{array}{l} \text{METAR} \\ \text{or} \\ \text{SPECI} \end{array} \right. \text{CCCC (YYGGggZ) [AUTO] [BBB] dddffGf_mf_m \left\{ \begin{array}{l} \text{KMH or} \\ \text{KT or} \\ \text{MPS} \end{array} \right. d_n d_n d_n V d_x d_x d_x$$

$$\left\{ \begin{array}{l} \text{VVVD}_v V_x V_x V_x V_x D_v \\ \text{or} \\ \text{CAVOK} \end{array} \right. \left\{ \begin{array}{l} \text{RD}_R \text{RD}_R / \text{VR}_R \text{VR}_R \text{VR}_R \\ \text{or} \\ \text{RD}_R \text{RD}_R / \text{VR}_R \text{VR}_R \text{VR}_R \text{VV}_R \text{VR}_R \text{VR}_R \text{Ri} \end{array} \right. w'w'(ww) \left\{ \begin{array}{l} N_s N_s N_s h_s h_s h_s \\ \text{or} \\ \text{VV} h_s h_s h_s \\ \text{or} \\ \text{SKC} \end{array} \right.$$

$$T'T'T'dT'd \quad QP_H P_H P_H P_H \quad REw'w' \quad \left\{ \begin{array}{l} \text{WS RWYD}_R \text{D}_R \\ \text{or} \\ \text{WS ALL RWY} \end{array} \right.$$

[RMK] [Layer Type and Opacity] [General Remarks] [SLPppp]

$$\left\{ \begin{array}{l} (\text{TTTTT TTGGgg dddffGf_mf_m} \\ \text{or} \\ \text{NOSIG}) \end{array} \right. \left\{ \begin{array}{l} \text{KMH or} \\ \text{KT or} \\ \text{MPS} \end{array} \right. \left\{ \begin{array}{l} \text{VVV} \\ \text{or} \\ \text{CAVOK} \end{array} \right. \left\{ \begin{array}{l} w'w' \\ \text{or} \\ \text{NSW} \end{array} \right. \left\{ \begin{array}{l} N_s N_s N_s h_s h_s h_s \\ \text{or} \\ \text{VV} h_s h_s h_s \\ \text{or} \\ \text{SKC} \end{array} \right.$$

* Brackets valid only for FM 15-IX Ext. METAR

[] Denotes Canadian Practice only

20.1 Interpretation of the Symbols

20.1.1	METAR	Is the name of the code for an aviation routine weather report.
20.1.2	SPECI	Is the name of the code for aviation selected special report.
20.1.3	CCCC	Four letter ICAO location identifier.
20.1.4	(YYGGggZ)	The time of observation.
	YY	Date of observation.
	GG	Hour of observation.
	gg	Minute of observation.
	Z	Denotes Universal Time Coordinated (UTC).
20.1.5	dddffGf _m f _m KT	Wind velocity.
	ddd	Wind direction.
	ff	Wind speed.
	G	Gust.
	f _m f _m	Maximum wind gust.
	KT	Nautical miles per hour.
20.1.6	[AUTO]	Auto station report indicator.
20.1.7	[BBB]	Correction indicator.
20.1.8	d _n d _n d _n Vd _x d _x d _x	Wind direction variability.
	d _n d _n d _n	First extreme wind direction.
	V	Variable.
	d _x d _x d _x	Last extreme wind direction.
20.1.9	VVVVD _v V _x V _x V _x V _x D _v	Visibility groups
	VVVV	Visibility.
	D _v	Not used in Canada
	V _x V _x V _x V _x	Not used in Canada.
20.1.10	CAVOK	Not used in Canada.
20.1.11	RD _R DR/V _R V _R V _R V _R i	Runway Visual Range.
20.1.12	RD _R DR/V _R V _R V _R V _R VV _R V _R V _R i	Runway Visual Range (variable).
	R	Indicator.
	DRDR	Runway Designator.
	i	Trend indicator.
20.1.13	W'W'	Present weather at or near the aerodrome.

20.1.14 (WW)	Not used in Canada.
20.1.15 N _s N _s N _s h _s h _s h _s	Cloud amount and height.
N _s N _s N _s	Cloud amount.
h _s h _s h _s	Cloud height.
20.1.16 VVh _s h _s h _s	Vertical visibility.
VV	Indicator.
h _s h _s h _s	Vertical visibility.
20.1.17 SKC	Sky clear.
20.1.18 T'T'/T' _d T' _d	Temperature and dewpoint.
T'T'	Air temperature
/	Separator.
T' _d T' _d	Dewpoint.
20.1.19 QP _H P _H P _H P _H	Observed QNH (altimeter setting).
Q or A	Indicator Q for hectopascals, A for inches.
P _H P _H P _H P _H	QNH value.
20.1.20 REw'w'	Recent weather.
RE	Indicator.
w'w'	Weather phenomena.
20.1.21 WS RWYD _R D _R	Wind shear information.
20.1.22 WS ALL RWY	Wind shear information.
20.1.23 RMK	Indicator
(Layer Type and Opacity) Layer or obstruction information.	
(General Remarks) miscellaneous general remarks, auto station remarks.	
SLPppp	Sea-level pressure information.
SLP	Indicator.
ppp	sea-level pressure.

20.2 DESCRIPTION AND CODING INSTRUCTIONS FOR CANADIAN METAR PRODUCTION

20.2.1 The following phenomena are to be entered in specific fields in the new data entry screen or entered in remarks if not equipped with the appropriate data entry screen.

20.2.2 Group $d_n d_n d_n V d_x d_x d_x$

20.2.2.1 Wind direction variability. If, during the 10 minute period preceding the observation, the total variation in wind direction is 60° or more and the mean wind speed is greater than 3 knots, the observed two extreme directions between which the wind has varied shall be given for $d_n d_n d_n V d_x d_x d_x$ in clockwise order. Otherwise this group shall not be included.

20.2.2.2 $d_n d_n d_n$ - First extreme wind direction.

20.2.2.3 V - Variable

20.2.2.4 $d_x d_x d_x$ - Last extreme wind direction.

20.2.2.5 Enter wind direction variation in the specific field or enter in remarks in the following format: i.e. 240V350.

20.2.3 Groups $RD_R D_R / V_R V_R V_R V_R i$ or $RD_R D_R / V_R V_R V_R V_R V_R V_R V_R i$

20.2.3.1 Runway visual range. RVR shall be reported when the prevailing visibility is 1SM or less and/or the RVR for the designated runway is 6,000 feet or less.

20.2.4 Group $RD_R D_R / V_R V_R V_R V_R i$

20.2.4.1 R Indicator.

20.2.4.2 $D_R D_R$ The designator of each runway for which runway visual range is reported. Parallel runways should be distinguished by appending to $D_R D_R$ letters L, C or R indicating the left, central or right parallel runway, respectively. A suitable combination of these letters is used for up to, and including, five parallel runways (i.e. LL, L, C, R, RR). The letter(s) shall be appended to $D_R D_R$ as necessary in accordance with the standard practice for runway designation.

20.2.4.3 $V_R V_R V_R V_R$ Mean value of runway visual range over the 10-minute period immediately preceding the observation. However, when the 10-minute period includes a marked discontinuity in the RVR (for example, sudden advection of fog, rapid onset or cessation of an obscuring snow shower), only the data after the discontinuity shall be used for obtaining mean RVR values and variations thereof, hence the time interval in these circumstances shall be correspondingly reduced. FT shall be appended to the measurement to indicate that the measurement is in feet.

20.2.4.4i If the runway visual range values during the 10-minute period preceding the observation show a distinct upward or downward tendency such that the mean during the first five minutes varies by 300 feet or more from the mean during the second five minutes of the period, this shall be indicated by $i = U$ for upward and $i = D$ for downward tendency of runway visual range values. when no distinct change in runway visual range is observed, $i = N$ shall be used. When it is not possible to determine the tendency, i shall be omitted.

20.2.5 Group $RD_RD_R/V_RV_RV_RV_RVV_RV_RV_Ri$ Significant variations of runway visual range. When the RVR at a runway varies significantly and when during the 10-minute period preceding the nominal observation time the one-minute mean extreme values assessed vary from the mean value by more than 150 feet or more than 20% of the mean value, whichever is greater, the one-minute mean minimum and the one-minute mean maximum values shall be given in that order in the form $RD_RD_R/V_RV_RV_RV_RVV_RV_RV_Ri$ instead of the 10-minute mean. The tendency shall also be indicated.

20.2.5.1 When actual RVR values are outside the measuring range of the observing system in use, the following procedure shall apply:

- (a) When the RVR is greater than the maximum value which can be assessed with the system in use, P shall be appended to the group $V_RV_RV_RV_R$ i.e. P6000.
- (b) When the RVR is below the minimum value which can be assessed with the system in use, M shall be appended to the group $V_RV_RV_RV_R$ i.e. M0600.

20.2.5.2 Transmit RVR data in the specified field. Sites that are using remarks section to transmit RVR shall code as follows: i.e. RVR RWY 29 1200FT. Tendency and variations will not be reported in remarks.

20.2.6 MIFG Report when shallow fog is occurring at the station. Shallow fog does not appreciably reduce visibility at eye level (1.8 m above ground), although the visibility within the fog is less than 5/8 mile.

20.2.7 BCFG Fog patches consist of fog extending to at least two metres above ground level and whose areal extent comprises less than 50% coverage of the ground normally visible from the observing point. The letter abbreviation BCFG shall be used to report fog patches covering part of the aerodrome; the apparent visibility in the fog patch shall be less than 1000 metres (5/8 mi.). BCFG should be used only when the visibility in parts of the aerodrome is 1000 metres (5/8 mi.) or more although, when the fog is close to the observing point, the minimum visibility will be less than 1000 metres (5/8 mi.).

20.2.8 PRFG Non-patchy fog (more or less continuous fog) extending to at least two metres above ground level covering part of the aerodrome. The apparent visibility within the area of fog shall be less than 1000 metres (5/8mi.) PRFG describes a fog bank or area of fog (or ice fog) which may have small breaks, however within the area of fog at least 50% of the ground must be covered.

20.2.9 DRSN Drifting snow. Used when particles of snow are raised by the wind in such quantity that very low objects are veiled or hidden and yet the visibility at eye level is not appreciably restricted. (This will replace the term DRFTG SNW in remarks.)

20.2.10 PO Dust or sand whirls (commonly known as a dust devil) consist of an ensemble of particles of dust or sand, sometimes accompanied by small litter, raised from the ground by the wind, in the form of a whirling column of varying height with a small diameter and an approximately vertical axis. Report when occurring at the station. (This will replace the remark DUST DEVILS or DUST WHIRLS)

20.2.11 VA Volcanic ash. Volcanic ash consists of fine particles of rock powder which have been blown out from a volcano. The ash may remain suspended in the atmosphere for long periods, producing red sunsets thousands of kilometres away. Report when occurring at the station.

20.2.12 DS Duststorm. Dust raised to great heights by a strong turbulent wind. The forward portion of the storm may have the appearance of a wide high wall. The visibility at eye level is reduced to less than 5/8 of a mile (+DS visibility < 5/16 mile).

20.2.13 SS Sandstorm. Sand raised to great heights by a strong turbulent wind. The forward portion of the storm may have the appearance of a wide high wall. The visibility at eye level is reduced to less than 5/8 of a mile (+SS visibility < 5/16 mile).

(see also definitions in appendix ii)

Note: "At the station" and "at the aerodrome" are used interchangeably. These terms are used to describe events that are happening at the location of the observer. "In the vicinity" means events that are occurring near to but not "at the station". For METAR purposes "in the vicinity" describes phenomena that are within 8 KM (5 miles) of the observer but not actually occurring at the observers location. This definition works well for precipitation and most obstructions to vision however, some phenomena (like dust devils) would be deemed to be "at the station" if occurring within the airport perimeter. **Tornadoes, funnel clouds and waterspouts present another case and shall be reported as occurring "at the station" when within sight (at any distance).**

20.2.14 RE codes. Recent weather phenomena of operational significance. Recent weather is reported when the phenomena is observed during the period since the last routine report (hourly report), but not at the time of observation. Recent weather shall be included if the same phenomenon of the same or greater intensity (disregarding character of precipitation) is not reported as present weather. Recent weather will be reported in routine reports (SA) and specials (SP).

- 20.2.14.1 REFZDZ Recent freezing drizzle. Report when freezing drizzle is observed during the period since the last routine report, but not at the time of observation.
- 20.2.14.2 REFZRA Recent freezing rain. Report when freezing rain is observed during the period since the last routine report, but not at the time of observation.
- 20.2.14.3 RERA Recent moderate or heavy rain. Report when moderate or heavy rain has occurred since the last routine report, but not at the time of observation.
- 20.2.14.4 REDZ Recent moderate or heavy drizzle. Report when moderate or heavy drizzle has occurred since the last routine report, but not at the time of observation.
- 20.2.14.5 RESN Recent moderate or heavy snow. Report when moderate or heavy snow has occurred since the last routine report, but not at the time of observation.
- 20.2.14.6 REPE Recent moderate or heavy ice pellets. Report when moderate or heavy ice pellets have occurred since the last routine report, but not at the time of observation.
- 20.2.14.7 REGR Recent moderate or heavy hail. Report when moderate or heavy hail has occurred since the last routine report, but not at the time of observation.
- 20.2.14.8 REGS Recent moderate or heavy snow pellets. Report when moderate or heavy snow pellets have occurred since the last routine report, but not at the time of observation.
- 20.2.14.9 REBLSN Recent moderate or heavy blowing snow. Report when moderate (visibility > 5/16 mile and 6 miles or less) or heavy blowing snow (visibility < 5/16 mile) has occurred since the last routine report, but not at the time of observation.

- 20.2.14.10 RESS Recent sandstorm. Report when a sandstorm has occurred since the last routine report, but not at the time of observation.
- 20.2.14.11 REDS Recent duststorm. Report when a duststorm has occurred since the last routine report, but not at the time of observation.
- 20.2.14.12 RETS Recent thunderstorm. Report when a thunderstorm has occurred since the last routine report, but not at the time of observation.
- 20.2.14.13 REVA Recent volcanic ash. Report when volcanic ash has occurred since the last routine report, but not at the time of observation.
- 20.2.14.14 REFC Recent funnel cloud, tornado or waterspout. Report when a funnel cloud, tornado or waterspout has occurred since the last routine report, but not at the time of observation.
- 20.2.15 VC codes. VC indicates significant weather phenomena observed in the vicinity of the aerodrome. "In the vicinity" means within 8 KM (5 miles) but not within the perimeter of the aerodrome (see note page 20 - 6). VC codes shall be reported in routine reports and specials. VC codes shall replace the corresponding SA type remark ie. VCSH would be used to replace the remark SNW SHWR 3 MI E.
- 20.2.15.1 VCSH Showers in the vicinity. Used when showers are observed in the vicinity but not at the station.
- 20.2.15.2 VCDS Duststorm in the vicinity. Used when a duststorm is occurring in the vicinity.
- 20.2.15.3 VCSS Sandstorm in the vicinity. Used when a sandstorm is occurring in the vicinity.
- 20.2.15.4 VCFG Fog in the vicinity. Used to report any type of fog observed in the vicinity.
- 20.2.15.5 VCPO Dust/sand whirls in the vicinity. Used when dust or sand whirls are observed in the vicinity.
- 20.2.15.6 VCBLDU Blowing dust in the vicinity. Used when blowing dust is observed in the vicinity.
- 20.2.15.7 VCBLSA Blowing sand in the vicinity. Used when blowing sand is observed in the vicinity.
- 20.2.15.8 VCBLSN Blowing snow in the vicinity. Used when blowing snow is observed in the vicinity.
- 20.2.16 WS RWY DRDR Wind shear on one runway. Used when wind shear is reported on take-off or landing on one runway from surface to 500 metres (1600 ft.).
- 20.2.17 WS ALL RWY Wind shear on all runways. Used when wind shear is affecting all runways from surface to 500 metres (1600 ft.).

20.3 THE METAR CODE - DETAILED DESCRIPTION

20.3.1 GENERAL. Detailed coding instructions for each element of each group of the METAR code are given below. Canadian variations of the code are stated in bold. The observer will find that most elements will automatically be encoded from the weather observation input, however some new phenomena are introduced that must be observed specifically for the METAR observation.

20.3.2 Group **METAR** or **SPECI** Shall be included at the beginning of an individual report. These groups will be generated by the METAR encoder.

20.3.3 Group **CCCC** Four letter station identifier. This will be generated by the computer.

20.3.4 Group **YYGGggZ** Time group, this is inserted by the METAR encoder.

YY - day of month

GG - hour of the day.

gg - minute of the hour.

Z - Indicates UTC.

20.3.4.1 **AUTO** - Indicates if the report is from an auto station or an auto station with manually added remarks. This group is generated by the computer.

20.3.4.2 **BBB** - Correction indicator. Use **CCA** for first correction, **CCB** for second correction and **so on**. This group is coded from the input screen.

20.3.5 Group **dddffGf_mf_m** wind velocity. This group will be coded by the Metar encoder.

ddd - wind direction in degrees true. **The term VRB is not used in Canada.**

ff - wind speed. Two figures if under 100, three if 100 or more.

Gf_mf_m - Peak gust if 10 units over ff. Otherwise this group shall not be reported.

KMH, MPS or KT. KT for knots is used in Canada. Appended by METAR encoder.

20.3.6 Group **d_nd_nd_nVd_xd_xd_x** Wind direction variability. If, during the 10 minute period preceding the observation, the total variation in wind direction is 60° or more and the mean wind speed is greater than 3 knots, the observed two extreme directions between which the wind has varied shall be given for **d_nd_nd_nVd_xd_xd_x** in clockwise order. Otherwise this group shall not be included. This group shall be reported by the observer.

d_nd_nd_n - First extreme wind direction.

V - Variable

d_xd_xd_x - Last extreme wind direction.

20.3.7 Groups **VVVVD_v V_xV_xV_xV_xD_v** visibility in metres. **Not used in Canada. These groups are replaced with the group VVVVSM.** Visibility shall be reported in statute miles and fractions of statute miles using the letters "SM" to indicate units. Conversion will be done by the METAR encoder.

20.3.8 **VVVV** Symbolic for **CAVOK**. **Cavok will not be reported in Canada.**

20.3.9 Group $RD_RDR/V_RV_RV_RV_Ri$ Runway visual range. Where RVR data is displayed, it shall be included in hourly and special observations. RVR shall be reported for the active, or most aligned into the wind runway(s) when the prevailing visibility is 1SM or less and/or the RVR value for the designated runway(s) is 6,000 feet or less. Stations with the capability to display values for multiple RVR's may record and transmit a maximum of four RVR values. All RVR values transmitted shall be representative of the touchdown zone of the active landing runway(s).

R Indicator.

D_RD_R The designator of each runway for which runway visual range is reported. Parallel runways should be distinguished by appending to D_RD_R letters L, C or R indicating the left, central or right parallel runway, respectively. A suitable combination of these letters is used for up to, and including, five parallel runways (i.e. LL, L, C, R, RR). The letter(s) shall be appended to D_RD_R as necessary in accordance with the standard practice for runway designation.

$V_RV_RV_RV_R$ Mean value of runway visual range over the 10-minute period immediately preceding the observation. However, when the 10-minute period includes a marked discontinuity in the RVR (for example, sudden advection of fog, rapid onset or cessation of an obscuring snow shower), only the data after the discontinuity shall be used for obtaining mean RVR values and variations thereof, hence the time interval in these circumstances shall be correspondingly reduced. FT shall be appended to the measurement to indicate that the measurement is in feet.

i If the runway visual range values during the 10-minute period preceding the observation show a distinct upward or downward tendency such that the mean during the first five minutes varies by 300 feet or more from the mean during the second five minutes of the period, this shall be indicated by $i = U$ for upward and $i = D$ for downward tendency of runway visual range values. When no distinct change in runway visual range is observed, $i = N$ shall be used. When it is not possible to determine the tendency, i shall be omitted. When the tendency is not displayed, i shall be omitted.

20.3.10 Group $RD_RDR/V_RV_RV_RV_RV_VV_RV_RV_Ri$ Significant variations of runway visual range. when the RVR at a runway varies significantly and when during the 10-minute period preceding the nominal observation time the one-minute mean extreme values assessed vary from the mean value by more than 150 feet or more than 20% of the mean value, whichever is greater, the one-minute mean minimum and the one-minute mean maximum values shall be given in that order in the form $RD_RDR/V_RV_RV_RV_RV_VV_RV_RV_Ri$ instead of the 10-minute mean. The tendency shall also be indicated.

20.3.10.1 When actual RVR values are outside the measuring range of the observing system in use, the following procedure shall apply:

- (a) When the RVR is greater than the maximum value which can be assessed with the system in use, a P shall be appended to the group $V_RV_RV_RV_R$ i.e. P6000. The METAR encoder will convert this to the ICAO standard.
- (b) When the RVR is below the minimum value which can be assessed with the system in use, a M shall be appended to the group $V_RV_RV_RV_R$ i.e. M0600. The METAR encoder will convert this to the ICAO standard.

~~20.3.10.2~~

~~4.10.2~~ Enter RVR data in the specified field. Sites that are using remarks section to transmit RVR will code as follows: i.e. RVR RWY 29 1200 FT. Tendency and variations will not be reported in remarks.

20.3.11 Group $w'w'(ww)$ Present weather group. One or more $w'w'$ groups, but not more than three, shall be used to report all present weather phenomena observed at or near the aerodrome and of significance to aeronautical operations in accordance with Code table 4678. **More than three $w'w'$ groups may be reported in Canada.**

WMO CODE TABLE 4678

QUALIFIER		WEATHER PHENOMENA		
INTENSITY OR PROXIMITY 1	DESCRIPTOR 2	PRECIPITATION 3	OBSCURATION 4	OTHER 5
- Light	MI Shallow	DZ Drizzle	BR Mist	PO well de- velopped Dust or Sand Whirls
	PR Partial			
Moderate (no quali- fier)	BC Patches	RA Rain	FG Fog	SQ Squalls
	DR Low Drifting	SN Snow	FU Smoke	
+ Heavy	BL Blowing	SG Snow Grains	VA Volcanic ash	FC Funnel Cloud(s) (Tornado or Water Spout)
	SH Shower(s)	IC Diamond Dust	DU widespread dust	
VC In the Vicinity	TS Thunderstorm	PE Ice Pellets	SA Sand	SS Sandstorm
	FZ Supercooled	GR Hail	HZ Haze	
		GS Snow Pellets		