

# METEOROLOGY

Aviation Routine Weather Report (METAR)

# METAR

01

## Report of Actual Weather Conditions

An aerodrome routine meteorological report (METAR) describes the actual weather conditions at a specified location and at a specified time as observed from the ground.

02

## On an Hourly Basis

METAR observations are normally taken and disseminated on the hour.

03

## Special Reports

An aerodrome special meteorological report (SPECI), the name of the code for an aerodrome special meteorological report, will be reported when weather changes of significance to aviation are observed

04

## Generated by Computer Software

In Canada, METARs and SPECIs are not encoded by the observer, but are generated by computer software, based on hourly or special observations taken at either staffed or automatic sites.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Report type

The code name METAR (or SPECI) is given in the first line of text. An aerodrome special meteorological report (SPECI) is issued only when significant changes in weather conditions occur off the hour.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
0VC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Location Indicator

Canadian aviation weather reporting stations are assigned four character International Civil Aviation Organization (ICAO) indicators commencing with C and followed by W, Y or Z. These stations are normally located within 1.6 NM (3 km) of the geometric centre of the runway complex. Aviation weather reporting sites are listed in the Canada Flight Supplement (CFS).

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Date and Time of Observation

The date (day of the month) and time (Coordinated Universal Time [UTC]) of the observation are included in all reports. The official time of the observation (on the hour) is used for all aerodrome routine meteorological reports (METARs) that do not deviate from the official time by more than 10 min. In SPECIs, the time refers to the time of occurrence (hours and minutes) of the change(s) which required the issue of the report.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Report Modifier

This field may contain two possible codes: “AUTO” or “CCA”. Both codes may appear simultaneously, i.e. “AUTO CCA”. “AUTO” is used when data for the primary report is gathered by an automated weather observation system (AWOS).

“CCA” is used to indicate corrected reports. The first correction is indicated as CCA, the second as CCB, etc.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
0VC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```

### > Wind

This group reports the 2 minutes mean wind direction and speed, along with gusts. Wind direction is always three digits, given in degrees (true) but rounded off to the nearest 10°. Wind speeds are two digits (or three digits, if required) and in knots. Calm is encoded as "00000KT". In Canada, the unit for wind speed is knots and is indicated by including "KT" at the end of the wind group.

### > Gusts

Gust information will be included if gust speeds exceed the average wind speed by 5 kt or more in the 10 minutes period preceding the observation and the peak gust reaches a maximum speed of 15 kt or more. "G" indicates gusts and the peak gust is reported, using two or three digits as required.

### > Variation in Wind Direction

This group reports variations in wind direction. It is only included if, during the 10 minute period preceding the observation, the direction varies by 60° or more and the mean speed exceeds 3 kt.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Prevailing Visibility

The prevailing visibility is reported in statute miles and fractions. There is no maximum visibility value reported. Lower sector visibilities which are half or less of the prevailing visibility are reported as remarks at the end of the report.



## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Runway Visual Range (RVR)

RVR) for the touchdown zone is reported as a 10 minute average, based on the maximum runway light settings at the time of the report. It is included if the prevailing visibility is 1 SM or less, and/or the RVR is 6 000 ft or less. “R”, the group indicator, is followed by the runway designator (e.g. 06), to which may be appended the letters “L”, “C”, or “R” (left, centre, or right) if there are two or more parallel runways. The RVR value is then reported in hundreds of feet, using three or four digits. FT indicates the units for RVR are feet.

“M” preceding the lowest measurable value (or “P” preceding the highest) indicates the value is beyond the instrument range.

The RVR trend is then indicated if there is a distinct upward or downward trend (encoded “/U” or “/D” for upward or downward) or if no distinct change is observed, the trend “/N” is encoded. If it is not possible to determine the trend, the field will be left blank.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```

### > Present Weather

Present weather is comprised of weather phenomena, which may be one or more forms of precipitation, obscuration, or other phenomena. Weather phenomena are preceded by one or two qualifiers; one of which describes either the intensity or proximity to the station of the phenomena, the other of which describes the phenomena in some other manner.

### > Intensity Qualifier

(-) light  
(no sign) moderate or not relevant  
(+) heavy

### > Proximity Qualifier

VC is used if these phenomena are observed within 5 SM, but not at the station.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```

## > Sky Conditions

This group reports the sky condition for layers aloft. A vertical visibility (VV) is reported in hundreds of feet when the sky is obscured. All cloud layers are reported based on the summation of the layer amounts as observed from the surface up, reported as a height above the station elevation in increments of 100 ft to a height of 10 000 ft, and thereafter in increments of 1 000 ft. The layer amounts are reported in eighths (oktas) of sky coverage as follows:

SKC	“sky clear”	no cloud present
FEW	“few”	less than 1/8 to 2/8 summation amount
SCT	“scattered”	3/8 to 4/8 summation amount
BKN	“broken”	5/8 to less than 8/8 summation amount
OVC	“overcast”	8/8 summation amount
CLR	“clear”	clear below 25 000 feet

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Temperature and Dew Point

This group reports the air temperature and the dew point temperature, rounded to the nearest whole Celsius degree (e.g. +2.5°C would be rounded to +3°C).

Negative values are preceded by the letter M, and values with a tenths digit equal to precisely 5 are rounded to the warmer whole degree. For example, 2.5, -0.5, -1.5, and -12.5 would be reported as 03, M00, M01 and M12, respectively.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Temperature and Dew Point

This group reports the altimeter setting. 'A' is the group indicator, followed by the altimeter setting indicated by a group of four figures representing tens, units, tenths and hundredths of inches of mercury.

To decode, place a decimal point after the second digit (e.g. A3006 becomes 30.06).

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
OVC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Wind Shear

This group contains reports of low level wind shear (within 1 500 ft AGL) along the take-off or approach path of the designated runway. The two-digit runway identifier is used, to which the letters “L”, “C”, or “R” may be appended. If the existence of wind shear applies to all runways, “WS ALL RWY” is used.

## Example

```
METAR CYXE 292000Z CCA  
09015G25KT 3/4SM  
R09/4000FT/D -RA BR BKN008  
0VC040 21/19 A2992 WS RWY  
09 RMK SF5NS3 VIS NW 3/8  
SLP134 DENSITY ALTITUDE  
2500FT
```



## Wind Shear

Remarks will appear in reports from Canada, prefaced by RMK. Remarks will include, where observed, layer type and cloud or obscuring phenomena (in eighths of sky covered or oktas), general weather remarks, and sea level pressure, as required. The sea level pressure, prefixed by “SLP” and indicated in hectopascals, will be the last mandatory field in the METAR. Density altitude will be indicated after sea level pressure when the density altitude is 200 ft or more than the aerodrome elevation.