



METAR

**HECA 290925Z 04009KT 010V070 7000 -DZRA FEW006 SCT010
BKN022 19/12 Q1008 BECMG 9999=**

What what what what????? Wow, I don't understand this. All I see is letters and numbers is what you are probably thinking, right? Still it's a lot easier than you might think. The information is divided into "blocks". Some blocks pertain to the wind speed and direction. Another block pertains to the type of cloud you can expect to find at certain altitudes.

METAR is an abbreviation for;

METeorological **AV**iation **R**outine **W**eather **R**eport

This data comes from the code in accordance with the ICAO standard. This data is all represented in UTC or ZULU time and not in (LT) Local Time. Most METAR data is automatically generated and not made manually. It may well be that they are corrected by people. We would then see the word **CORR** (correction) in the METAR. The METAR is divided into 12 parts, but this is not always fully shown on your report. On a lot of ATIS frequencies (real time) you hear this information so that you are prepared for your landing or departure. This information changes constantly. 00:00Z (Z=UTC time), is the beginning of a new forecast series . Of course, this does not have to be exactly at midnight, it could also happen that the first weather report is generated at 03.00 in the morning or even later . An attribution to this, is "information A" (Alpha). As soon as the second generated weather forecast becomes active we call this "B" (bravo), and the next one "Information C" etc. etc.

This information is only intended to be local. So information from **HEGN** is certainly not suitable for an airport as **HESH** even though they are close to each other. Therefore each airport has its own METAR data. In order to be properly prepared for your flight you will need the METAR for both your departure and destination airfield and the weather during your flight. It may happen that you could encounter huge Cumulus nimbus (CB) (see photo) during your flight and it would be advisable in this instance to plot another route to prevent any complications you might encounter.



So good flight planning starts with knowing the METAR.

Let us explain to you step by step what this METAR tells us;

**HECA 290925Z 04009KT 010V070 7000 -DZRA FEW006 SCT010
BKN022 19/12 Q1008 BECMG 9999=**

A METAR is always structured in the following recognizable groups:

Identifier Group	: HECA 290925Z
Wind group	: 04009KT 010V070
Visibility group	: 7000
Significant Weather (Wx) group	: -DZRA
Cloud information group	: FEW006 SCT010 BKN022
Temp/dewpoint group	: 19/12
Pressure Group	: Q1008
Trend Group	: BECMG 9999

Identifier Group

HECA is the ICAO code of the relevant airport. In this case it is CAIRO airport.

The METAR was generated on the **29th** day. The month is not mentioned. The day is always written in a two number sequence, so let's say it was generated on the third day of a month it would read 03.

The last four figures pertain to the time in UTC (Zulu), hence you see a Z at the end. In this instance the weather report was generated at **09.25 Zulu time** (UTC).

Wind group

04009KT 010V070 tells us the wind direction and the speed at which the wind blows. Here we are talking about the wind measured at the airport itself, sometimes also called surface winds. The winds that blow at a higher level (winds aloft) have nothing to do with this. The first three digits indicate the heading from which the wind is coming.

In this case the wind is coming from a heading of **040** degrees. The last digits indicate the speed in knots at which the wind is blowing. In this case it is **09 knots**. It may also happen that the report shows something like 040G18KT. The "G" stands for Gust and as a result of that you can expect extremes of 18 knots.

We already know that the wind is coming from a heading of 040 but with this additional information it has become clear that the winds are **Variable** blowing between a heading of 010 degrees to a heading of 070 degrees.

note: you will see variable winds in the METAR if winds vary MORE than 60 degrees



Visibility group

This section shows the visibility range. In our case we have a visibility of **7000 meter**. We use meters here and not feet. It may happen that visibility is expressed in Statute Miles, for example 10SM means a visibility range of 10 Statute Miles. If visibility is less than 50 meters, then it will read 0000. If visibility is 10 kilometers or better, then you will see 9999 . It may also be that the vision for a certain direction is worse than in a different direction. To give you an example:
1000SE 5000N From this we can see that in the Southeast visibility is down to 1.000 meters, meanwhile in the North the visibility is 5.000 meters.

Significant Weather (Wx) group

This group shows additional information about **precipitation** (rain, snow, etc. everything that falls) or **obscuration** (fog, mist etc...everything that blocks your clear view) In our example we have **-DZRA**. There is a minus sign in front so that tells that it is of a lesser extent. DZ means Drizzle and RA means Rain. So we can expect to see light drizzle and rain.

Cloud information group

Clouds are not the same everywhere so it may consist of more than 1 coded groups. There could be clouds at 2000 feet and another type of cloud at 3000 feet and maybe even another type at 9000 feet. There are a number of codes you need to know;

- The amount of cloud cover is expressed with the following letter combinations:
 - *SKC* (sky clear) 0/8 of the sky covered or 0 octa's cloud.
 - *FEW* (few) 1/8 to 2/8.
 - *SCT* (scattered) 3/8 to 4/8.
 - *BKN* (broken) 5/8 to 7/8.
 - *OVC* (overcast) 8/8.
 - *VV* (vertical visibility) if the visibility is so poor that no clear cloud ceiling can be determined, then a vertical visibility will be issued.
 - *CLR* (clear) no clouds below 3500 meter, this is mainly applied in automatically generated METAR
 - *NSC* (no significant clouds), no clouds below 5000ft unless MSA is higher and no cumulus nimbus in the vicinity.
 - *NCD* (no clouds detected), no clouds detected by the clouds altimeter.
- The altitude of cloud cover is indicated in hundreds of feet /// or if it can't be measured (for example in thick fog)
- If there is cumulus nimbus in the vicinity, this is represented by:
 - *CB* (cumulonimbus) thundercloud
 - *TCU* (towering cumulus) cloud with a large vertical structure



You see it's not as hard as you thought it was, is it?. In our example we have **FEW006 SCT010 BKN022** meaning: (FEW) clouds at a height of 600ft (you see two 0's after the 6).

We see that there is scattered clouds cover at 1000ft and a broken layer of clouds at 2200ft

Temperature/dewpoint group

Left of the "/" is the temperature at the local airport **19 degrees Celsius** and to the right the dew point temperature of **12 degrees Celsius**. In this case it relates to temperatures above freezing point. If it was related to temperatures below freezing we would see something like: 01/M04, we see here that the temperature is 01 degrees Celsius and the dew point temperature is -04, minus 4 degree Celsius denoted by the letter M.

a little note on the term: DEWPOINT

The dewpoint temperature is the temperature at which the air can no longer hold all of its water vapor, and some of the water vapor must condense into liquid water. The dew point is always lower than (or equal to) the air temperature.

If the air temperature cools to the dew point, or if the dew point rises to equal the air temperature, then dew, fog or clouds begin to form. At this point where the dew point temperature equals the air temperature, the relative humidity is 100%.

If there is then further cooling of the air, more water vapor must condense out as even more dew, fog, or cloud, so that the dew point temperature then falls along with the air temperature

Pressure Group

In our example we see **Q1008** and this represents the barometric pressure . In our case we see a "Q" and this indicates that it relates to Hecto Pascal. If it was pertaining to Mercury of Inches then there would be a letter "A" in front of it.

The air pressure or QNH is therefore decisive in making sure that all aircraft fly at the same altitude when descending through the TA (Transition Altitude). But even more important is that the ground height can be determined and this is necessary when landing.

Trend Group

In the final section of our Metar we see what the weather will be doing, BECMG (becoming). In this case we see 9999 so they are obviously talking about visibility. It is now 7000 meter as we mentioned earlier but will shortly become **9999** , or 10KM or more. All messages after the QNH are expected to occur an hour or two later. You could also see TEMPO (temporary) which means exactly as its name suggests.



Just to clarify this a bit more for you I will list a few codes :

- Change Indicator: (these can also be used at military air bases in combination with colourstates)
 - *NOSIG* (no significant change)
 - *BECMG* (becoming) gradual change in the next two hours
 - *TEMPO* (temporarily) temporary change
 - *FM* (from) change from the specified time
 - *TL* (until) change until the specified time
 - *AT* (at) change at the specified time
 - *FCST CANCEL* indicates that during a certain period no landing expectations will be issued.

- previously mentioned components, such as *visibility* and current *weather*:
 - *NSC* (no significant clouds)
 - *NSW* (no significant weather)

At military air bases they make use of a *colorstate*. The provision is based on the worst measured or observed visibility and the lowest base of a cloud layer that has a covering degree of 3/8 or more, (scattered or more). The following table shows the different colors with their codes and corresponding limits :

Visibility and Cloud base	> 8 km	5 - 8 km	3,7 - 5 km	1,6 - 3,6 km	0,8 - 1,6 km	< 0,8 km
> 2500 feet	BLU	WHT	GRN	YLO	AMB	RED
1500 - 2500 feet	WHT	WHT	GRN	YLO	AMB	RED
700 - 1500 feet	GRN	GRN	GRN	YLO	AMB	RED
300 - 700 feet	YLO	YLO	YLO	YLO	AMB	RED
200 - 300 voet	AMB	AMB	AMB	AMB	AMB	RED
< 200 voet	RED	RED	RED	RED	RED	RED

The colorstate *BLACK* is used when the landing and take-off runway can not be used, this may have a meteorological reason (example: slippery surface).



CODES FOR METAR

DZ= DRIZZLE
RA= RAIN
SN= SNOW
GS= SMALL OR SOFT HAIL
GR= HAIL
PE= ICE PELLETS
IC= ICE CRYSTALS
TS= THUNDERSTORM
HZ= HAZE
BR= MIST
FG= FOG
FU= SMOKE
SS= SANDSTORM
DS= DUSTSTORM
PO= DUST DEVILS
DU= DUST
SA= SAND
SQ= SQUALL
FC= FUNNEL CLOUD (Tornado or Waterspout or similar)
UP= UNKNOWN PRECIPITATION

The following codes can only be put before one of the above codes. They can't be used on their own.

- = LIGHT
(no symbol) = MODERATE
+ = HEAVY
RE= RECENT
FZ= FREEZING
BL= BLOWING
DR= DRIFTING

The codes can be combined, or used individually. Below, you'll find some examples:

+SHRA= HEAVY SHOWERS of RAIN
RASN= SLEET (RAIN & SNOW)
TSGR= THUNDERSTORM WITH HAIL
BLSN= BLOWING SNOW
-FZRA= LIGHT FREEZING RAIN
RADZ= RAIN & DRIZZLE
RERA= RECENT RAIN



Example:

**EHAM 010000Z VRB02KT 0000 R19R/0050V0250D R01R/0050N
R27/0200D R06/0000U +SN +BLSN FZFG VV001 M01/M01 Q0999
BECMG FM0100 03015G25KT 5000 SHSN BKN005CB**

This would read as :

Amsterdam (EHAM) at 0000GMT on the 1st of this month.
Wind variable 2 knots,
Visibility less than 50m,
RVR Runway 19 Right, Varying between 50m and 250m, Decreasing; RVR
Runway 01 Right, 50m, No change; RVR Runway 27, 200m, Decreasing;
RVR Runway 06, less than 50m, Increasing.
Heavy Snow, Heavy Blowing Snow, Freezing Fog.
Sky Obscured, vertical visibility 100ft.
Temperature -1, Dew Point -1
QNH 999 millibars.
Becoming, From 0100, Wind 030 degrees 15 knots maximum 25 knots,
Visibility 5km, Snow Showers, Broken Cumulonimbus at 500ft."



Now one more tricky issue: **The METAR Runway report**

METAR reports may include runway reports (sometimes referred to as the Eight figure group) which contains information about contamination on the runway like snow or water which makes it harder for a pilot to safely come to a full stop landing. The type and amount of contamination coverage ultimately determines the so called friction coefficient. How much grip will the tires have on the runway....is it slippery? Do i need a longer runway etc...

A runway report consists of eight digits in five groups ($R_R R_R E_R C_R e_R e_R B_R B_R$) with the following interpretation:

$R_R R_R$	E_R	C_R	$e_R e_R$	$B_R B_R$
Runway designator. The numerical identifier of the runway in question.	Type of deposit on runway.	Extent of deposit.	Depth of deposit.	Friction coefficient or braking action
88 means all runways.	0: Clear and dry	1: 1–10 %	00: Less than 1 mm	01...90: Friction coefficient times
99 indicates repetition of previous report.	1: Damp	2: 11–25 %	01...90: The depth in millimeters	100. For example, 37 indicates a friction coefficient of 0.37.
If there are two parallel runways, the right one is indicated by adding 50 to its number. For example, runway 04L (or 04) is denoted by 04, whereas 54 means runway 04R.	2: Wet or puddles	5: 26–50 %	92: 10 cm	91: Poor braking action
	3: Frost	9: 51–100 %	93: 15 cm	92: Poor/medium braking action
	4: Dry snow		94: 20 cm	93: Medium braking action
	5: Wet snow		95: 25 cm	94: Medium/good braking action
	6: Slush		96: 30 cm	95: Good braking action
	7: Ice		97: 35 cm	99: Unreliable measurement
	8: Compacted snow		98: 40 cm	//: Not given
	9: Frozen ridges		99: Runway not in use	
	/: Not reported			

Note: **CLRD** may replace elements -- $E_R C_R e_R e_R$ -- if the runway has been cleared of deposits. For example, **54CLRD95** means runway 04R cleared, braking action good.



Example:

- **9949//91** indicates the condition of the runway:
 - **99** indicates either a specific runway (eg 25 = Rwy 25 or 25R; adding 50 will indicate Left Runway) or all the airport's runways ("99"). Some locations will report the runway using 3 characters (eg 25L)
 - **4** means the runway is coated with dry snow
 - **9** means 51 to 100% of the runway is covered
 - **//** means the thickness of the coating was either not measurable or not affecting usage of the runway
 - **91** means the braking index is bad, in other words the tires have bad grip on the runway

Be aware of the fact that on IVAO you will also see the first 2 identifiers written like: RUNWAY /

Example:

- **R18C/ 591092** indicates the condition of the runway:
 - **R18C /** indicates runway 18 Center
 - **5** means the runway is coated with dry snow
 - **9** means 51 to 100% of the runway is covered
 - **10** means the thickness of the coating is 10mm
 - **92** poor to medium braking action.

Read this document carefully over and over again to familiarize yourself with the reading of METAR . As I mentioned already it is not that difficult. Routine is the proper way to get yourself acquainted with METAR data.



TAF

TAF is an abbreviation for;

Terminal Aerodrome Forecast

The TAF complements the METAR reports and use similar encoding. They are normally produced by a human weather forecaster.

Let me give you an example

```
EHAM 171041Z 1712/1818 29013KT 9999 SCT025 PROB30 TEMPO 1712/1717 31018KT  
7000 -SHRA SCT018CB BECMG 1713/1715 26010KT TEMPO 1717/1818 32015G25KT  
4000 SHRASN TSGS SCT010 BKN016CB BECMG 1723/1801 31013KT BECMG  
1812/1815 30008KT
```

Dont get intimidated by the hughe list of numbers and letters because there is a logical order to read this like a METAR

The forecast of Amsterdam recorded at the 17th of this month at 10:41 Z on the 17th 12 o'clock Zulu till the 18th 18 oclock Zulu time the winds will come from heading 290 with 13 knots. Visibility 10 km or better, scatterd clouds at 2500ft...with a probability of 30%

Temporary change expected on the 17th 12 o'clock till the 17th 5 oclock the winds will come from heading 310 with 18 knots, visibility 7000 meters with light showering rains, etc...etc...etc...

The only difference you see now in the TAF that it uses a lot of:

day + time period

From...Till

Probability

Temporary changes expected

Becoming



QUICK VIEW METAR (**MET**eological **A**erodrome **R**eport)

ATIS : Automatic Terminal Information Service e.g. in IVAP : .atis HECA_TWR

1 Report type identification

minimas
accurate.

METAR **MET**eological **A**erodrome **R**eport
 SPECI Special report due to heavy fluctuations or below METAR
AUTO Automatic report (behind date time group) regarded less
 TAF Terminal aerodrome **F**orecast.

2 ICAO Identifier (4-letter)

e.g. : HECA Cairo

3. Issuance Time DDHHMMz (UTC)

e.g. : 251030 = 25th of this month at 10:30 Zulu time

4. Wind

	Heading	ident	speed	ident	speed	unit	heading	ident	heading
Prevailing	3 digits		2 digits	-	-	KT Knots KMH Kilometers/hour MPS Meters/second	-	-	-
Variable	-	VRB	-	-	-	KT Knots KMH Kilometers/hour MPS Meters/second	-	-	-
Gusts	3 digits		2 digits	G	2 digits	KT Knots KMH Kilometers/hour MPS Meters/second	-	-	-
Variable more than 60°	*	*	*	*	*	* *	3 digits	V	3 digits
CALM	000	-	00	-		KT Knots	-	-	-

KT= knots KMH= Kilometers per hour MPS=Meters per second

NDV : Non Directional Variation detected by wind sensor (ONLY with AUTO METAR)

5. Horizontal Visibility

	runway	separator	range	unit	(Variability)	tendency
PV Prevailing			4 digits 1 digit	- Meters SM Statute Miles F Fractions FT Feet		
RVR runway visibility range	2 digits L Left R Right C Center	/	P Plus more than 4 digits M Minus less than 1 digit	- Meters SM Statute Miles F Fractions FT Feet	V	U Up D Down N No change
9999	visibility 10 km or more					

Example: R18R/1200FTV/U



6. Present Weather

Intensity Intensiteit	Descriptor Sleutelwoord	Precipitation Neerslag	Obscuration Verduistering	Other Anders
		Dominant type listed first		
- Light	BC Bancs	DZ Drizzle	BR Brume visibility < 1000m	DS Dust storm
No Qualifier Moderate	BL Blowing High blowing, 6 feet or more above the ground	GR Grêle Hailstone D >= 5mm	DU widespread Dust	FC Funnel cloud
+ Heavy	DR Drifting Low blowing	GS Grésil Hailstone D < 5mm	FG Fog Visibility < 1000m (5/8SM)	+FC Tornado
VC Vicinity Within 8 km (5SM) of the aerodrome but not at the aerodrome	FZ Freezing	IC Ice crystals	FU Fume	LN Lightning
	MI Minor	PE Ice Pellets	HZ Haze	PO Poussière
	PR Partial	RA Rain	PY Spray	SS Sandstorm
	SH Showers	SG Snow grains	SA Sand	SQ Squall
	TS Thunderstorm	SN Snow	VA Volcanic ash	
			UP unidentified Precipitation	

7. Sky coverage ABOVE GROUND LEVEL (AGL)

ident	height	unit		coverage in octas
SKC Sky clear	3 digits	-	100s of Feet	0
NSC No significant clouds	3 digits	-	100s of Feet	0
FEW Few	3 digits	-	100s of Feet	1-2
SCT Scattered	3 digits	-	100s of Feet	3-4
BKN Broken	3 digits	-	100s of Feet	5-7
OVC Overcast	3 digits	-	100s of Feet	8
CB Cumulonimbus				
TCU Towering Cumulonimbus				

CAVOK Ceiling and visibility OK	Visibility is 10km or better No clouds below 1500M (5000ft) unless MSA (minimum safe altitude) is HIGHER ! No Cumulonimbi (thick fluffy cloud cluster at ANY altitude) No precipitation, or other obscuration (so no rain fog etc.)
----------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

NCD : Nil clouds detected by cloud sensor (ONLY with AUTO METAR)



8. Temperature and Dewpoint

2 digits + (M) / 2 digits + (M)

M = Minus (below zero) e.g: 12/M05 : temperature +12 °C / dewpoint -5 °C

9. Altimeter setting

Q + 4 digits : QNH in mbar / hPa

A + 4 digits : Altimeter in inchHg

10. Recent Weather

- RE = Recent weather followed by weather codes (see group 6)

•

11. Supplementary information

- WS = Windshear, followed by:
TKOF/LDG (takeoff/landing)
RWY (2 digits runway identifier and designator L/R/C)
- RMK = Remark
- Sealevel pressure
SLP176 Sea level pressure 1017.6 millibars
SLP998 Sea level pressure 0998 millibars
- Temperature correction
T00170017 Temperature + 1.7 degrees and dewpoint + 1.7 degrees
T10171017 Temperature - 1.7 degrees and dewpoint - 1.7 degrees

12. Trend Forecast (2 hours from time of observation) (Not used in US)

- PROB and 2 digits (30 or 40) = probability 30% or 40%
- Used to indicate the probability of occurrence of alternate element(s) or temporary fluctuations
- Change Indicator
- BECMG = Becoming (used where gradually changes are expected to reach or pass through specified values within the next coming 2 hours)
- TEMPO = Temporary (fluctuations of less than one hour duration)
- NOSIG = No significant change to the reported conditions within the next 2 hours.
- INTER – Intermittent, changes within certain intervals (Australia only)
- FM = From , + Zulu time , changes will start from given time point e.g. FM 1030
- TL = Until, + Zulu time, changes will occur until given time e.g. TL 1230
- AT = At , + Zulu time, changes will take place at given time e.g. AT 1245
- FCST CANCEL = during a certain period no forecast or landing expectation report will be made.
- NSC = no significant clouds
- NSW = no significant weather
- NDV = Non directional variation by the windsensor (ONLY produced by AUTO METAR)
- NCD = Nil clouds detected by the cloud sensor (ONLY produced by AUTO METAR)

- Forecast Wind (same as item 4)
- Forecast Visibility (as item 5)
- Forecast Weather (as item 6)
- Forecast Cloud (as item 7)



Eight Figure Group

1-2	3	4	5-6	7-8
runway designator	Deposits	Extent of Contamination	Depth of deposits	Friction coefficient / braking action
2 digits	0 Clear & Dry	1 < 10% contaminated (covered)	00 Less than 1mm	28 Friction coefficient 0.28
2 Left digits	1 Damp	2 11% to 25% contaminated (covered)	01- Measurement in mm 90	35 Friction coefficient 0.35
2 Right digits + 50	2 Wet or water particles	5 26%-50% contaminated (covered)	92 10cm	91 Braking action poor Braking action medium to poor
88 all rwys	3 Rime or frost covered	9 51%-100% contaminated (covered)	93 15cm	92
99 repetition of last message	4 Dry Snow	/ Not reported (rwy clearance in progress)	94 20cm	93 Braking action medium Braking action medium to good
	5 Wet Snow		95 25cm	94 good
	6 Slush		96 30cm	95 Braking action good
	7 Ice		97 35cm	99 Figures unreliable
	8 Compact or rolled snow		98 40cm or more	Braking action not reported or runway not operations or airport closed.
	9 Frozen ruts or ridges		99 Runway not operational due to snow, slush, ice, large drifts or runway clearance, depth not reported	//
	/ not reported (rwy clearance in progress)		// Not operationally significant or not measurable	

