Met. O. 950 (1982 edition)

METEOROLOGICAL OFFICE

ABBREVIATED WEATHER REPORTS

(INSTRUCTIONS TO OBSERVERS)

LONDON: HER MAJESTY'S STATIONERY OFFICE

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Introductory note

The codes and specifications set out in this publication supersede all previous instructions relating to reports in abbreviated code and operate with effect from 1 January 1982.

The observer should read these instructions with the *Register of Observations* (Metform 2611 (1982 edition)) in front of him. The code tables given in Section 5 are in the same order as that of the corresponding symbols in the code and correspond to the tables given on Wall cards Met. O. 951 and Met. O. 951A.

SECTION 1 REGISTER OF OBSERVATIONS

1.1 The *Register* is the permanent record of a station's observations and its coded reports. It may be called for at a later date to provide evidence in a Court of Law or data for an important investigation. It has been arranged so that the sequence of columns from 2 to 35 is the same as that of the symbols in the code. Consequently when the code figures have been entered the complete coded message can be sent without any rearrangement of the figures. The symbols representing the elements to be entered in each column are printed at the top of the column. For those stations not recording temperatures columns 10 – 15 will always be left blank; on occasions of insignificant weather the weather group, columns 16 – 18, will not be sent and when no cloud is present there will be no entries in columns 19 – 35. The coded report may thus vary in length.

1.2 A pocket sized pad is provided for the observer's use when actually making the observations. The use of odd scraps of paper is to be avoided. In all columns of the *Register of Observations* the space for each set of observations is divided into upper and lower portions by a thin dotted line. Where required, the initial observation should be written above the line and the corresponding code figure below the line; all entries must be completed in blue or black ink. The entry above the line of column 15 is the **wet-bulb** reading but below the line the entry will be the computed **dew-point.** Space is provided for up to 13 observations per day and for those stations reporting the National Climatological Message (NCM) a new page must be used for each day's observations. Stations not submitting the NCM and recording 6 or less observations per day may enter more than one day's observations per page. Where this is done a space must be left between each day's observations, and the day's date must be clearly entered in column 1.

1.3 If for any reason a figure is missing from the coded message it will be replaced by an oblique (or solidus) '/'. When this results in all the information of the group being replaced by solidi (for most groups this will be four solidi) then that group will not be reported. Care must be taken not to confuse a / with a figure 1.

1.4 If an error is discovered after entry in the *Register of Observations* the incorrect entry should be crossed out in red ink without obscuring the original entry and the correct figure written in red ink close to the original entry. A serial number should be allotted to the correction, starting at 1 in each *Register,* entered in red ink in the Remarks column, and the correction page at the back of the *Register of Observations* completed.

If an error is discovered after the observation has been despatched the correction should be passed to the collecting office. However, there is a time limit beyond which notification is unnecessary. This is usually when the next observation time is reached.

SECTION 2 REPORTS AT FIXED HOURS

2.1 An internationally agreed code is used for the exchange of weather information. The SYRED code is an abbreviated version of that code for use in the United Kingdom. The standard form used is:

iii $i_R i_x$hVV Nddff $1s_nTTT$ $2s_nT_dT_dT_d$ $7wwW_1W_2$ 333 $8N_sCh_sh_s$

555 $1V'\overline{V}'f'f'$

2.2 These letters represent the position occupied in the actual message by the code figures of the various elements reported.

iii = Station number

i_R = Indicator, precipitation (coded as 4 at all SYRED stations)
i_x = Significant weather indicator — Table 2 page 26
h = Height of lowest layer of cloud — Table 3 page 26
VV = Visibility — Table 4 page 27

N = Total amount of cloud — Table 5 page 28
dd = Wind direction — Table 6 page 28
ff = Wind speed — Table 7 page 29

1 = Indicator, dry-bulb temperature
s_n = Sign of dry-bulb temperature (+ or −) — Table 8 page 29
TTT = Dry-bulb temperature

2 = Indicator, dew-point temperature
s_n = Sign of dew-point temperature (+ or −) — Table 8 page 29
$T_dT_dT_d$ = Dew-point temperature

7 = Indicator, weather
ww = Present weather — Table 11 page 30
W_1 = Past weather — Table 12 page 34
W_2 = Past weather — Table 12 page 34

333 = Indicator

8 = Indicator, cloud layer
N_s = Cloud amount — Table 5 page 28
C = Type of cloud — Table 19 page 35
h_sh_s = Height of base of cloud layer — Table 20 page 36

555 = Indicator

1 = Indicator, fog and/or gusts
V'V' = Visibility in metres
(f')f'f' = Speed in knots of maximum gust in past hour

2.3 Entries in the *Register of Observations* are as follows:

Column 1. Enter the month in the space provided at the top of the page. Enter the date in the space below. When more than one day's observations are entered on a page the new date must be inserted between each day's observations. Enter against each observation the time of completion to the nearest minute GMT. (During BST subtract one hour to obtain GMT.)

Column 2. iii Enter the station number.

Column 3. i_R The entry below the line at SYRED stations is always 4.

Column 4. i_x Enter below the line the selected code figure according to the entry in the weather group $7wwW_1W_2$ (see para. 3.8 page 15).

Column 5. h Enter below the line the code figure for the height of the lowest cloud reported. Enter 9 when no cloud is present and / when the sky is obscured.

Column 6. VV Enter above the line the visibility in metres up to and including 5000 metres but in kilometres above 5000 metres. Below the line enter the code figure for the visibility.

Column 7. N Enter below the line the code figure for the total amount of cloud.

Column 8. dd Enter above the line the direction of the wind if it is initially read as a compass point, otherwise leave blank. Enter below the line the code figure for the wind direction.

Column 9. ff Enter above the line the observed wind speed in knots or the estimated wind force on the Beaufort scale (e.g. Beaufort force 3 would be entered as F3). Enter below the line the wind speed in knots corrected to a standard height of 10 metres or the equivalent wind speed in knots of the Beaufort force.

Column 10. 1 Enter below the line the indicator 1 whenever the temperature group is reported.

Column 11. s_n Enter above the line a minus (−) sign whenever the dry-bulb temperature is below 0.0 °C. (Plus (+) signs need not be used.) Enter below the line the code figure for the sign of the dry-bulb temperature.

Column 12. TTT Enter above the line the dry-bulb temperature in degrees and tenths including the decimal point. Enter below the line the coded value of the dry-bulb temperature, e.g. 0.6 °C coded as 006, 1.6 °C coded as 016, 11.6 °C coded as 116.

Column 13. 2 Enter below the line the indicator 2 whenever the dew-point temperature is reported.

Column 14. s_n Enter above the line a minus (−) sign whenever the **wet**-bulb temperature is below 0.0 °C. (Plus (+) signs need not be used.) Enter below the line the code figure for the sign of the **dew**-point temperature.

Column 15. $T_dT_dT_d$ Enter above the line the **wet**-bulb temperature in degrees and tenths including the decimal point. Enter below the line the coded value of the computed **dew**-point.

Column 16. 7 Enter below the line the indicator 7.

Column 17. ww Enter below the line the code figure for the present weather.

Column 18. W_1W_2 Enter above the line the Beaufort letters descriptive of the sequence of past weather conforming as far as possible to the appropriate period (see para. 3.7 page 14). Enter below the line two code figures for past weather. If different code figures are used for W_1 and W_2 then W_1 must be the higher code figure.

When the entries for ww, W_1 and W_2 are insignificant the group is not to be reported (see para. 3.8 page 15). On these occasions brackets '( )' should be inserted in the *Register of Observations* around the whole group to indicate to the observer that the group is not to be included in the message sent to the collecting office.

Column 19. 333 Enter below the line the indicator 333 whenever cloud groups are reported.

Columns 20 – 35. $8N_sCh_sh_s$ The group is included whenever cloud is present at the time of the observation. If two or more types of cloud occur with their bases at the same level and this level is to be reported in accordance with the rules given below then C refers to the cloud type that represents the greatest amount and N_s refers to the total amount of all clouds at that level. If there is more than one cloud layer an entry is made for each such layer in ascending order of height commencing with the lowest layer.

Significant cloud layers, defined below, are entered below the line. Any other cloud present which does not fall under the classification of 'significant cloud' should be recorded above the line in columns 21 – 35, starting with the lowest layer in columns 21 – 23. The indicator 8 is not entered for these layers.

When the sky is obscured the group is entered and reported as $89/h_sh_s$ with h_sh_s being the vertical visibility coded from the height table (see para 3. 2(ii)).

Whenever the cloud height has been measured by searchlight enter the letter (M) against the code for the height.

The selection of layers of significant cloud is made in accordance with the following rules:

1. The lowest layer of any amount.
2. The next higher individual layer of amount ⅜ or more.
3. The next higher individual layer of amount ⅝ or more.
4. Cumulonimbus clouds when observed and not reported under the rules given above by means of a group referring exclusively to cumulonimbus and inserted in order of ascending height.

Column 20. 8 Enter below the line the indicator 8 whenever a cloud group is to be reported.

Column 21. N_s Enter below the line the code figure for the amount of the lowest significant cloud layer.

Column 22. C Enter below the line the code figure for the type of the lowest significant cloud layer.

Column 23. h_sh_s Enter below the line the code figure for the height of the lowest significant cloud layer.

Columns 24 – 27, 28 – 31 and **32 – 35** will be used for reporting and/or recording the next higher layers.

Column 36. Remarks This space may be used to record any additional information. Of particular interest are times of onset and cessation of precipitation, fog, gales, thunder, etc.

On occasions of visibility less than 100 m and/or wind gusting to 43 kn or more as recorded on an anemograph, a special group should be entered in the remarks column and sent with the observation:

555 Indicator, fog and/or gusts

1 Enter indicator 1
V′V′ Enter visibility in metres
(f′)f′f′ Maximum gust during past hour in knots

When only one element is to be reported then the other element will be coded as //. For example: Visibility 75 m, no gusts above 43 kn encoded

555 175//.

When reporting gusts greater than 99 kn the entry will be 1/f′f′f′. For example: Maximum gust 109 kn encoded

555 1/109.

In the unlikely event of visibility less than 100 m and maximum gust greater than 99 kn two groups will be reported. For example: Visibility 45 m, gust 112 kn encoded

555 145// 1/112.

SECTION 3 NOTES ON THE OBSERVATIONS

3.1 The *Observer's Handbook* contains full details of the procedure for making observations. These notes concentrate on aspects which are of particular importance for observers preparing abbreviated weather reports.

3.2 Cloud Observations

(i) *Cloud height*

The estimation of the height of the base of clouds is far from easy, particularly for the observer with no means of comparing estimates with subsequent measurements (e.g. by aircraft). The observer should endeavour to estimate the cloud height as follows:

heights below 1000 ft	— to the nearest 100 ft
heights between 1000 and 2000 ft	— to the nearest 200 ft
heights between 2000 and 5000 ft	— to the nearest 500 ft
heights above 5000 ft	— to the nearest 1000 ft.

At stations where hills or mountains can be seen, cloud height can be judged very easily when the cloud covers part of a mountain of known height. Cloud height can be estimated fairly reliably when the cloud almost touches a mountain. Any very tall structures, towers, chimneys, etc. can be very useful in determining cloud height.

As a guide in selecting suitable code figures for the height of altocumulus, altostratus (medium level clouds) and cirrus, cirrocumulus, cirrostratus (high level clouds) the following height ranges are generally applicable in the latitudes of the UK:

Medium level clouds	6500 ft – 20 000 ft
High level clouds	16 500 ft – 45 000 ft

If great difficulty is encountered estimating heights of medium and high level clouds then the following nominal heights may be reported:

(a) Medium cloud

Nominal height of lowest layer	10 000 ft (3000 m) h_sh_s	= 60
Nominal height of any second layer	15 000 ft (4500 m) h_sh_s	= 65

(b) High cloud

Nominal height of lowest layer	25 000 ft (7500 m) h_sh_s	= 75
Nominal height of any second layer	35 000 ft (10 500 m) h_sh_s	= 81

Nominal heights are not allocated to low clouds but the usual range of cloud-base heights is as follows:

Stratus	Surface – 2000 ft
Stratocumulus	1000 – 4500 ft
Cumulus	1000 – 5000 ft
Cumulonimbus	2000 – 5000 ft

When estimating cloud heights at night, success depends on the correct identification of the form of the cloud. General meteorological knowledge and a close watch on the weather are very important in judging whether the height of a cloud base has remained substantially unchanged or has risen or fallen. The observer should allow two or three minutes for his eyes to become adapted to darkness before making the observations, which should be made from a dark place as far as possible from lights, especially when the atmosphere is hazy. A chapter dealing with cloud observations at night will be found in *Cloud Types for Observers* (Met. O. 716).

At night the height of the cloud base can be measured by cloud searchlight if this instrument is available. The searchlight throws a bright spot of light on the base of the cloud vertically above it, and the observer measures the angle of elevation of the spot by means of an alidade sited about 1000 ft from the searchlight. A list of cloud heights equivalent to each angle of elevation is provided for each site and cloud heights should be obtained from the list.

Full details of the use of the cloud searchlight will be found in the *Observer's Handbook*.

(ii) *Vertical visibility*

The vertical visibility may be taken as the height above ground at which a balloon in daylight, if rising vertically, would disappear from view.

When the obscuring medium is so dense that the tops of tall structures are invisible from a point near their base, an estimate of vertical visibility can be made if the observer knows the height above ground of various points on the structures. An open structure, such as a lattice mast, is preferable to a building.

If the observer has no basis for making an estimate that can be considered reasonably reliable then the 8-group should be coded as 89///. If the sky is discernible the partially obscuring phenomena are ignored and the clouds are coded in accordance with instructions for reporting clouds.

(iii) *Cloud amount*

The observer has to estimate the amount of sky covered by all cloud (N) and the amount of sky covered by individual layers (N_s).

N—Total cloud amount

On a day when there are small elements of cloud scattered about the sky it would be helpful to imagine all these small elements pushed together into the same part of the sky. When brought together in this way it is easier to make an estimate of the total amount. When only a trace of cloud is present then code figure 1 will be used. Code figure 8 is used when the sky is totally covered. When the sky is almost completely covered but the observer can see one or two

small clear patches then code figure 7 will be used. Code figure 9 is used when either the sky is invisible through fog, snow, etc., or the observer cannot estimate the cloud amount due to darkness. On most nights it will usually be possible to estimate the total amount of cloud by observing any stars that are visible, although it should be borne in mind that stars near the horizon may be blotted out by haze alone.

N_s—Amount of cloud layers

An estimate is required of how much of the sky is covered by each layer as if it were the only cloud present in the sky. This requires the observer to spend some minutes on the observation to allow gaps, where present in the lower cloud, to reveal the amounts of upper layers. In general if no blue sky or stars can be seen through openings of the lower layers the observer is entitled to assume that the upper layer covers the whole sky and to code it as 8. It should be noted that the sum of the amounts of separate cloud layers will often exceed 8/8.

(iv) *Cloud forms*

Illustrations of the various cloud forms will be found in the *Observer's Handbook* and in *Cloud Types for Observers,* copies of which should be readily available to the observer. When selecting the code figure for C in the group 8 $N_sC\ h_sh_s$ the red figures given in *Cloud Types for Observers* should be used.

3.3 Visibility

A list of selected visibility objects is provided for auxiliary stations and should be displayed for the use of all observers.

It is, of course, important that the distances of all objects from the point of observation should be accurately determined and that the objects should be prominent and easily recognized. When the exact distance of visibility is between two of the distances given in the code table, the lower value is taken, e.g. a visibility of 270 m is coded as 02. When the visibility is different in different directions, code the value corresponding to the lowest visibility.

The code figures from 00 to 50 provide for the reporting of any visibility up to 5000 m with great precision, but it is not expected that observers will achieve this precision over the whole range. A coarse scale (code figures 90 – 99) is provided for use at stations where the observation of visibility is difficult owing to the absence of suitable objects or good viewpoints. Every effort should be made to use the main body of the table rather than this coarse scale.

Observers at coastal stations should report the visibility to landward in all their messages. If visibility to seaward differs substantially from the landward visibility it should be noted in the remarks column of the *Register.*

3.4 Wind

Observation of the direction and speed of the wind should be made from a well-exposed situation where the effects of local eddies due to buildings, trees, etc., are least. As the wind is seldom constant, but varies continuously, the observation of direction and speed should refer to average conditions over several minutes.

(i) *Direction*

The wind direction to be reported is the direction from which the wind is blowing. Where a station is equipped with a wind vane recording on a chart (anemograph) the observer should report the mean wind direction averaged over the last 10 minutes. However, when there has been a change of 30° or more in direction during this period, and the new direction has been maintained for at least 3 minutes, the observer should report the new direction.

If the wind direction is obtained from a dial or a simple vane the observer should take at least two readings of the mean wind direction at the beginning and end of the observations. If the two readings differ by 30° or more a third reading should be taken. If the last two readings agree the first reading is ignored. If the first and third reading agree then a mean of all three readings is reported. It is possible that on occasions when the wind speed is less than 3 knots all three readings may differ by 30° or more. In this case the last reading should be reported.

When no instrumental aid is available the observer may be guided by drift of smoke from elevated chimneys, movement of flags, blowing spray, by a light streamer attached to a tall pole for that purpose, movement of small saplings, leaves, etc. Cloud movement should not be used as this is often markedly different to the surface wind.

In calm conditions the wind direction is always coded as dd = 00.

(ii) *Speed or force*

The observer should follow the same procedure as for wind direction. At anemograph stations the observer reports the mean wind speed averaged over the last 10 minutes, but where there has been a change of 10 knots or more and this has been maintained for at least 3 minutes the observer reports the new speed. Where anemograph records are not available, but a reading is obtainable from a wind speed dial then, as with direction, two readings are taken. If the two readings differ by 10 kn or more then a third reading is taken. If the last two readings agree within 10 kn then the mean of these two readings is reported. If the third reading is nearer to the first reading, the observer should report the mean of all three readings.

Most anemometers are situated at a standard height of 10 metres above the ground level. Where surrounding obstacles such as buildings or trees disturb the airflow it will be necessary to increase the height of the anemometer in order to obtain an exposure which is virtually clear of these disturbances but which is as nearly as possible equivalent to that at 10 metres over open ground nearby. An 'effective height' will then need to be calculated for the anemometer. Full explanations on exposure of anemometers and definition of 'effective height' are given in the *Observer's Handbook*.

Where an 'effective height' has been calculated for the station's anemometer the wind speeds may need to be corrected. A table of corrections and instructions for their use will be issued to stations where necessary.

Hand anemometers should be used in positions well clear of buildings and other obstructions. If used at ground level, speeds read from the instrument will need to be increased by 30%.

At some stations wind speeds will have to be estimated and observers will find the specifications given in the Beaufort Scale (Table 7 page 29) of assistance in arriving at this estimate. Coastal stations may find the States of Sea card of use in estimating wind speeds.

3.5 Temperatures

At some stations thermometer screens have been installed and equipped with thermometers. These stations are required to include temperature groups with their observations.

All temperatures are read and reported to the nearest tenth of a degree. Dew-points, calculated from *Hygrometric tables* or humidity slide-rule, are also reported to the nearest tenth of a degree.

When reporting negative temperatures the minus (−) sign should be inserted before the reading but a plus (+) sign need not be used for positive values.

3.6 Present weather

The code is arranged in ten decades, the first five of which describe conditions with no precipitation at the station at the time of observation whilst the other five decades refer to precipitation at the time of the observation at the station. The highest applicable figure is to be selected but code figure 17 (thunderstorm but no precipitation at the time of observation) takes precedence over code figures 20 – 49.

A clear distinction must be drawn between showery and intermittent precipitation. Showers are characterised by their abrupt beginning and ending and by the generally rapid and sometimes violent variations in the intensity of the precipitation. Whether the precipitation occurs as showers or not depends

on the clouds from which it originates. Showers fall from convection (cumuliform) clouds whereas non-showery precipitation falls from layer (stratiform) clouds. It is thus possible at night and in doubtful cases by day to identify clouds by the character of their precipitation.

Precipitation is coded as continuous when it has continued without a break for at least 60 minutes. All other precipitation (except showers) is coded as intermittent. If precipitation stops before an observer has completed the observation, it is reported as 'in the past hour' provided this is the appropriate code figure. The classifications continuous and intermittent are applied to precipitation which has fallen from stratiform cloud.

The following notes will be found helpful when selecting the appropriate code figure for ww.

When coding 01, 02 and 03 there is no limitation on the magnitude of the change of the cloud amount. When the sky is clear at the time of the observation, ww = 00, 01, 02 may be used. The following interpretations will then apply:

ww = 00 is used when the preceding conditions are not known, for example at the first observation of the morning when the station has been closed overnight.
ww = 01 is used when the clouds have dissolved during the past hour.
ww = 02 is used when the sky has been continuously clear during the past hour.

When cloud is present at the time of the observation
ww = 01 is used when clouds are generally dissolving or becoming less developed.
ww = 02 is used when the state of sky is generally unchanged.
ww = 03 is used when clouds have increased in amount or become more developed during the past hour.

Code figure 05 is used when the obstruction to vision cannot be definitely attributed to smoke, dust, sand or water droplets, but is mainly caused by dry particles. When the phenomenon is not predominantly water droplets the appropriate code figure should be selected without regard to visibility. For code figures 04, 05, 06, 07 no visibility restriction, upper or lower, applies. Code figure 10, however, will be used only when visibility is reported as 1000 m or more, and the observer decides the obscurity is due to water droplets or ice crystals. (Relative humidity is 95% or more on these occasions.)

Code figures 11 and 12 refer to shallow fog or ice fog with visibility 1000 m or more above the fog layer. Shallow is defined as less than 2 m over land and less than 10 m over sea.

Code figure 17 is used when thunder is heard but there is no precipitation at the time of the observation.

Code figure 18 is used for reporting a squall. The definition of a squall is given as a sudden increase in wind speed of at least three stages of the Beaufort scale (or 16 kn), the speed rising to Force 6 (or 22 kn) or more for at least one minute.

Code figure 19 is used to report the presence of a cloud column or inverted cloud cone protruding from the base of a cumulonimbus cloud (rarely under cumulus cloud), often accompanied by a violent whirlwind.

Code figures 20 – 29 are used when precipitation, fog, ice fog or thunder has occurred during the preceding hour but is not occurring at the time of the observation.

Code figures 30 – 39 refer to duststorm, sandstorm, drifting or blowing snow at the time of observation. When the horizontal visibility is less than 1000 m but not less than 200 m the entry for ww is 30, 31 or 32. When less than 200 m the entry is 33, 34 or 35. The distinction between codes 30 – 35 and 06, 07 is that the airborne dust or sand is reported by one of the figures 30 – 35 when it is accompanied by strong winds. Code figures 36 – 39 are used to report snow raised from the ground after it has fallen.

Code figures 40 – 49 refer to fog or ice fog of substantial vertical depth. For shallow fog, less than 2 m, code figures 11 or 12 are used. For code figures 41 – 49 the visibility must be less than 1000 m. For ww = 40 the observed visibility at the station is greater than 1000 m but visibility in the distant fog or ice fog patch is less than 1000 m.

Code figures 24, 56, 57, 66, 67 refer to drizzle or rain which freezes on contact with solid objects causing glazed frost.

For observational purposes a thunderstorm is regarded as being at the station from the time thunder is first heard, whether or not lightning is seen or precipitation is occurring at the station. A thunderstorm is reported in present weather if thunder is heard within the normal observational period preceding the time of the report. A thunderstorm is regarded as having ceased at the time of the last audible thunder and the cessation is confirmed if thunder is not heard for 10 minutes after this time. When it is evident that the thunderstorm has already passed the station, the observer should not report 'thunderstorm at the time of observation' even though it is less than 10 minutes since the last peal of thunder was heard. However, if there is any doubt that the thunderstorm has passed, the report 'thunderstorm at the time of observation' will be made if the thunder has been heard within the last 10 minutes.

3.7 Past weather

Two entries are required for past weather W_1 and W_2. If the weather during the past weather period is best described by two different figures then the higher code figure is reported as W_1 and lower code figure as W_2. If the weather has not changed during the period, W_1 and W_2 will be the same.

The period covered by W_1W_2 is as follows:

The previous 6 hours for observations at 0000, 0600, 1200 and 1800 GMT
The previous 3 hours for observations at 0300, 0900, 1500 and 2100 GMT
The previous hour for all other observations.

The code figures for W_1W_2 should be selected in such a way that W_1W_2 and ww together give as complete a description as possible of the weather in the time interval concerned. For example, if the type of weather has undergone a change during the time interval concerned, the code figures selected for W_1 and W_2 should describe the weather prevailing **before** the type of weather indicated by ww began, bearing in mind that ww covers the period of the preceding 60 minutes only.

3.8 Significant weather

The group ($7wwW_1W_2$) is only reported if present or past weather of significance, or both, were observed. Weather coded as present weather (ww) 00, 01, 02 and 03 or past weather (W_1W_2) 0, 1 and 2 is not considered significant.

Following the decision on whether the weather group ($7wwW_1W_2$) is significant the code figure for i_x, in the group $4i_xhVV$, which follows the station number, is selected from Table 2 (page 26).

3.9 Beaufort letters

Beaufort letters are used to provide a continuous record of weather in a brief form and to identify individual weather phenomena.

Their entry above the line in column 18 of the *Register* in the correct sequence during the appropriate interval (see para. 3.7 page 14) will enable the correct selection of code figures for W_1W_2 to be made. Beaufort letters may be used in the remarks column of the *Register* when noting times of onset and cessation of various weather phenomena.

A complete list of Beaufort letters, international symbols and full instructions for their use are given in the *Observer's Handbook*.

A selection of the more commonly used Beaufort letters is given below.

State of sky

	Beaufort letter
0 – 2/8 cloud	b
3/8 – 5/8	bc
6/8 – 8/8	c
8/8 cloud cover, by a uniform layer	o

Precipitation

Drizzle	d
Rain	r
Snow	s
Hail	h

Atmospheric obscurity

Fog, visibility reduced by water droplets to 200 m or more but less than 1000 m	f
Fog, visibility reduced by water droplets to less than 200 m	F

Other phenomena

Gale, mean wind speed 34 – 47 kn over a period of 10 minutes or more	g
Storm, mean wind speed 48 kn or more over a period of 10 minutes or more	G
Thunderstorm	tl
Lightning	l
Dew	w
Hoar frost	x

The intensity of any phenomenon is indicated in the following manner:

Slight—the addition of the suffix 'o' to the Beaufort letter e.g. slight hail	h_o
Ordinary or moderate—the use of the Beaufort letter e.g. moderate hail	h
Intense, heavy or severe—the use of the capital Beaufort letter e.g. heavy hail	H
Violent—the addition of the suffix 2 to the capital Beaufort letter e.g. violent hail	H_2

Continuity of phenomena is indicated as follows:

Intermittent—the addition of the prefix 'i' e.g. intermittent moderate drizzle	id
Continuous—the repetition of the Beaufort letter e.g. continuous moderate drizzle	dd

To be classified as continuous, precipitation etc. must have continued for 60 minutes without a break but it need not have been continuous at the intensity currently reported over that 60 minute period.

3.10 Rainfall

Where a rain-gauge is installed it should be read and the measurement reported at 0900 and 2100 GMT covering the preceding 12 hours. If the station is not open at 2100 GMT the reading and report should relate to the 24 hours ending at 0900 GMT.

Collection of rain and drizzle by a rain-gauge and its subsequent measurement is straightforward. Hail or sleet may be similarly sampled and after thawing by natural or artificial means, e.g. application of a hot cloth to the outside of the funnel, the liquid equivalent may be measured.

Measurement of liquid equivalents of snowfall will present problems to all observers. If only light snow is falling then that snow within the funnel may be melted and added to any water already in the rain-gauge bottle and the total measured.

When all the precipitation has occurred as snow and no snow was on the ground prior to the snow to be measured, obtain a sample by pressing the empty inverted funnel of the rain-gauge vertically downwards through the level of undrifted snow until it touches the ground. Melt this sample and measure it in the rain measure. Due to uneven coverage it may be necessary to take more than one sample. Where possible three different samples should be taken from well separated positions. Each of the samples should be melted separately and the average liquid equivalent obtained.

During snowy periods, after the measurement of snow has been taken, a reasonably sized area should be cleared of snow so that on the next occasion the amount of fresh snow can be ascertained. Alternatively a board may be placed on the existing snow and the next sample taken from this board, which is then cleared. Thus on each occasion the extent of fresh snow fallen since the last occasion can be ascertained.

Further guidance on the measurement of rainfall and snowfall is given in the *Observer's Handbook*.

3.11 Snow depth

The total depth and fresh depth of snow, if recorded, should be measured in centimetres, using a rule held vertically. The measurement should be made at a representative spot in level snow in an area free from drifting and not scoured by the wind. If possible the measurement should be made near to the rain-gauge if one is installed. If the snow cover is uneven the depth should be measured at three different positions and a mean taken of all three readings.

3.12 Avoidance of Errors

Completion of the observation should be carried out briskly without sacrificing accuracy for speed. It is important to check the entries immediately after they are made in the *Register of Observations* to ensure that nothing has been omitted and that no gross error has been made. The whole observation should be examined to ensure that it is mutually consistent. Common errors are:

(a) 5 °C and 10 °C errors of misreading the thermometers, a second glance will avoid this easily made error.

(b) Maximum temperature *lower* than *highest* dry-bulb reading. This error is usually avoided by careful setting of the thermometer and checking that it agrees with the dry-bulb reading at the time of re-setting.

Minimum temperature *higher* than the *lowest* dry-bulb reading is treated in the same way as the maximum temperature discrepancy.

If a discrepancy is noted at the time of reading, the extreme value should be adjusted to agree with the dry-bulb. If the discrepancies are consistently greater than 0.3 °C the thermometer is to be regarded as suspect and should be replaced.

(c) Reading the wrong end of the minimum thermometer index.

(d) Rainfall readings inconsistent with reports of 'weather'.

(e) Visibility inconsistent with the entry for present weather.

(f) Snow depths inconsistent with present and past weather.

The measurement is in *centimetres* not millimetres.

3.13 Care of instruments and equipment

Care should be taken to keep the meteorological equipment clean and in good working order; this will ensure good performance and lengthen its useful life.

Thermometer screen

The thermometer screen should be brushed out frequently and about once a month a good wash with soap and water or detergent and water should be given.

Cleaning is best carried out after the early-morning observation (0900 GMT) so that the thermometers have time to recover from the disturbance before the next observation.

Thermometers

These require little attention, but in foggy conditions any moisture deposited on the dry bulb should be removed using a clean tissue or cloth.

The wet-bulb wick will only act efficiently when clean and for this reason it should be changed regularly.

The water used for maintaining the wet bulb should be purified water. Water obtained when defrosting a refrigerator may also be used. Clean rain water may be used in an emergency.

Bubbles may occur in any of the spirit thermometers and these bubbles must be cleared before the instrument can be used. The *Observer's Handbook* gives guidance on clearing these bubbles. When all the bubbles have been cleared the thermometer must be stood bulb-end downwards for 24 hours before being brought into use.

Anemograph

The recorder requires little attention other than keeping it clear of dust and spilt ink.

To enable full use to be made of the record, daily time marks should be made using a soft pencil or ball point pen. The date and time should be entered on the chart against this time mark.

Cloud searchlight

Regularly clean the cover glass and remove snow and ice from it whenever necessary.

Rain-gauge and rain measure

The gauge must be kept clear of fallen leaves or other debris which might block the funnel and thus prevent the collected water from flowing into the receiver. Care must be taken to avoid damage to the rain-gauge through bending or straining of the delivery pipe when ensuring that it enters the collecting bottle when the funnel is replaced, and to avoid damage to the casing when the grass is being cut around it.

The measure should be kept clean and stored in an inverted position (to drain) in a safe place when not in use.

3.14 Distant reading thermometers

Stations equipped with distant reading thermometers should check the temperature sensors once a week against the ordinary mercury-in-glass thermometers. The readings should be noted in the remarks column of the *Register of Observations*. The checks should be repeated if the differences are greater than 0.3 °C for dry-bub temperatures and 0.5 °C for wet-bulb temperatures. If the repeated checks cannot agree within these tolerances then the electrical sensors should be regarded as suspect and the collecting office informed.

SECTION 4 NATIONAL CLIMATOLOGICAL MESSAGES

4.1 The National Climatological Message (NCM) is a coded message for the exchange of climatological information. The message is sent once or twice daily by those stations requested to do so.

For those stations sending the message at 0900 GMT and 2100 GMT the standard message is:

At 0900	iii	$0s_nT_gT_gT_g$	$1s_nT_cT_cT_c$	$2/EE'E_c$		
	555	$0s_nT_xT_xT_x$	$1s_nT_nT_nT_n$	$2R_tR_tR_tR_t$	(These three groups cover the period 21 – 09)	
		$3/SSS$	$4s_nT_3T_3T_3$	$5s_nT_1T_1T_1$	6HTFG	7Ssss
		$8/s_ds_ds_d$				
	888	0EEEE	1EEEE	2E'E'E'E'	3E'E'E'E'	
At 2100	iii	444 $0s_nT_xT_xT_x$	$1s_nT_nT_nT_n$	$2R_tR_tR_tR_t$	(These three groups cover the period 09 – 21)	

For those stations sending the message at 0900 GMT only, the standard message is:

iii	$0s_nT_gT_gT_g$	$1s_nT_cT_cT_c$	$2/EE'E_c$		
555	$3/SSS$	$4s_nT_3T_3T_3$	$5s_nT_1T_1T_1$	6HTFG	7Ssss
	$8/s_ds_ds_d$				
666	$0s_nT_xT_xT_x$	$1s_nT_nT_nT_n$	$2R_tR_tR_tR_t$	(These three groups cover the period 09 – 09)	
888	0EEEE	1EEEE	2E'E'E'E'	3E'E'E'E'	

4.2 These letters represent the position occupied in the actual message by the code figures of the various elements reported.

iii = Station number

0 = Indicator, grass minimum temperature
s_n = Sign of grass minimum temperature (+ or –) Table 8 Page 37
$T_gT_gT_g$ = Grass minimum temperature

1 = Indicator, concrete minimum temperature
s_n = Sign of concrete minimum temperature (+ or –) Table 8 Page 37
$T_cT_cT_c$ = Concrete minimum temperature

2 = Indicator, state of ground and slab
/ = A solidus is always entered.
E = State of ground at 0900 GMT without snow or measurable ice cover. Table 16 Page 37

OR E′ = State of ground at 0900 GMT with snow or measurable ice cover Table 17 Page 38

E_c = State of concrete slab at 0900 GMT Table 22 Page 38

Note: Depending on snow or ice cover E OR E′ is reported, a solidus replacing the non-reported value.
When the concrete slab is covered by snow or the ground is frozen, or the state of the slab cannot be adequately described by the code figures in Table 22 (page 38), a solidus '/' is entered for E_c

444/555/666 = Indicator, periods of time

0 = Indicator, maximum temperature
s_n = Sign of maximum temperature (+ or −) Table 8 Page 37
$T_xT_xT_x$ = Maximum temperature

1 = Indicator, minimum temperature
s_n = Sign of minimum temperature (+ or −) Table 8 Page 37
$T_nT_nT_n$ = Minimum temperature

2 = Indicator, rainfall
$R_tR_tR_tR_t$ = Total amount of rainfall in tenths of a millimetre. Trace of precipitation (less than 0.05 mm) is entered as 9999.

Note: When following the indicator 444 these three groups refer to the period 0900 – 2100 GMT;
When following the indicator 555 these three groups refer to the period 2100 – 0900 GMT;
When following the indicator 666 these three groups refer to the period 0900 – 0900 GMT.

3 = Indicator, sunshine
/ = A solidus is always entered.
SSS = Total amount of bright sunshine, in tenths of an hour, for previous day.

4 = Indicator, 30 cm soil temperature
s_n = Sign of soil temperature (+ or −) Table 8 Page 37
$T_3T_3T_3$ = Soil temperature at a depth of 30 cm

5 = Indicator, 100 cm soil temperature
s_n = Sign of soil temperature (+ or −) Table 8 Page 37
$T_1T_1T_1$ = Soil temperature at a depth of 100 cm

6 = Indicator, weather phenomena
H = Day of hail, ice, etc. (0000 – 2400 GMT) Table 23 Page 39
T = Day of thunder (0000 – 2400 GMT)
1 = Thunder heard
0 = Thunder not heard
F = Day of fog
1 = Visibility at 0900 GMT less than 1000 m
0 = Visibility at 0900 GMT 1000 m or more
G = Day of gale (0000 – 2400 GMT)
1 = Gale (Mean wind speed 34 kn (Beaufort force 8) or more)
0 = No gale

Note: Entries for this group refer to the previous day.

7 = Indicator, snow or sleet
S = Day of snow or sleet (0000 – 2400 GMT previous day)
1 = Sleet
5 = Snow
0 = No snow or sleet
sss = Depth of snow in centimetres at 0900 GMT (day of observation) Table 18 Page 39

Note: Where the entry for Ssss is 0000 the group is not reported.

8 = Indicator, depth of fresh snow
/ = A solidus is always entered.
$s_ds_ds_d$ = Depth of fresh snow in centimetres at 0900 GMT (day of observation) Table 18 Page 39

Note: When there is no fresh snow or the depth is not measurable this group is not reported.

888 = Indicator, states of ground follow

0 = Indicator, states of ground
EEEE = State of ground without snow or measurable ice cover at 1200, 1500, 1800, 2100 GMT (previous day) Table 16 Page 37

1 = Indicator, states of ground
EEEE = State of ground without snow or measurable ice cover at 0000, 0300, 0600, 0900 GMT (day of observation) Table 16 Page 37

2 = Indicator, states of ground
E′E′E′E′ = State of ground with measurable snow or ice cover at 1200, 1500, 1800, 2100 GMT (previous day) Table 17 Page 38

3 = Indicator, states of ground
E′E′E′E′ = State of ground with measurable snow or ice cover at 0000, 0300, 0600, 0900 GMT (day of observation) Table 17 Page 38

Note: When the station is closed a solidus is to be entered in the appropriate position for E and E′.

Depending on snow or ice cover E *or* E′ is reported for each hour, a solidus will replace the non-reported entry.

When any of the groups for state of ground consist of four solidi, that group is not reported.

4.3 Stations completing NCMs should enter the readings in the *Register of Observations* in the spaces provided at the bottom of the right hand page. These entries should always be recorded on the same page as the 0900 GMT observation. The NCM should be made up from the readings available, those groups for which no data is available being omitted. The complete message is sent following the normal report.

SECTION 5 CODE TABLES

Part I

Code tables for use in SYRED code.

i_x	Indicator for inclusion or exclusion of present and past weather groups	Table 2
h	Height above ground of the base of the lowest cloud seen	Table 3
VV	Horizontal visibility at surface	Table 4
N,N_s	Amount of cloud	Table 5
dd	Conversion of wind direction read in compass points into code figures	Table 6
ff	Wind speed equivalent of Beaufort numbers	Table 7
s_n	Sign of temperature	Table 8
ww	Present weather	Table 11
W_1W_2	Past weather	Table 12
C	Type of cloud	Table 19
h_sh_s	Height of cloud	Table 20

i_x Indicator for inclusion or exclusion of present and past weather groups — Table 2

Code figure	Group $7wwW_1W_2$ is
1	included
2	omitted (no significant weather to report)
3	omitted (not observed, data not available)

h Height above ground of the base of the lowest cloud seen — Table 3

Code figure	feet	
0	0 – 150	(0 – 50 m)
1	150 – 300	(50 – 100 m)
2	300 – 600	(100 – 200 m)
3	600 – 1000	(200 – 300 m)
4	1000 – 2000	(300 – 600 m)
5	2000 – 3000	(600 – 1000 m)
6	3000 – 5000	(1000 – 1500 m)
7	5000 – 6500	(1500 – 2000 m)
8	6500 – 8000	(2000 – 2500 m)
9	Above 8000	(above 2500 m), or no clouds
/	Height of base of cloud not known or base of clouds at a level lower and tops at a level higher than that of the station	

NOTE: A height exactly equal to one of the values at the ends of the ranges is coded in the higher range; e.g. a height of 2000 ft is reported by code figure 5.

VV Horizontal visibility at surface — Table 4

Code figure	km	m	Code figure	km	m	Code figure	km	m
00	< 0.1	< 100	34	3.4	3400	67	17	
01	0.1	100	35	3.5	3500	68	18	
02	0.2	200	36	3.6	3600	69	19	
03	0.3	300	37	3.7	3700	70	20	
04	0.4	400	38	3.8	3800	71	21	
05	0.5	500	39	3.9	3900	72	22	
06	0.6	600	40	4.0	4000	73	23	
07	0.7	700	41	4.1	4100	74	24	
08	0.8	800	42	4.2	4200	75	25	
09	0.9	900	43	4.3	4300	76	26	
10	1.0	1000	44	4.4	4400	77	27	
11	1.1	1100	45	4.5	4500	78	28	
12	1.2	1200	46	4.6	4600	79	29	
13	1.3	1300	47	4.7	4700	80	30	
14	1.4	1400	48	4.8	4800	81	35	
15	1.5	1500	49	4.9	4900	82	40	
16	1.6	1600	50	5.0	5000	83	45	
17	1.7	1700	51	not used		84	50	
18	1.8	1800	52			85	55	
19	1.9	1900	53			86	60	
20	2.0	2000	54			87	65	
21	2.1	2100	55			88	70	
22	2.2	2200	56	6		89	> 70	
23	2.3	2300	57	7		90	< 0.05	< 50
24	2.4	2400	58	8		91	0.05	50
25	2.5	2500	59	9		92	0.2	200
26	2.6	2600	60	10		93	0.5	500
27	2.7	2700	61	11		94	1	1000
28	2.8	2800	62	12		95	2	2000
29	2.9	2900	63	13		96	4	4000
30	3.0	3000	64	14		97	10	
31	3.1	3100	65	15		98	20	
32	3.2	3200	66	16		99	≥ 50	
33	3.3	3300						

NOTES: (1) If the visibility is between two of the distances given in the table, the code figure for the lower distance is reported e.g. a visibility of 470 m is reported as 04.

(2) When VV = 00 the actual visibility is reported by the extra groups 555 $1V'\frac{f'}{V}f'f'$ at end of message.

N,N_s Amount of cloud **Table 5**

Code figure	
0	Nil
1	1 eighth of sky covered, or less, but not zero
2	2 eighths of sky covered
3	3 eighths of sky covered
4	4 eighths of sky covered
5	5 eighths of sky covered
6	6 eighths of sky covered
7	7 eighths of sky covered, or more, but not completely covered
8	Sky completely covered
9	Sky obscured or cloud amount cannot be estimated

dd Conversion of wind direction read in compass points into code figures **Table 6**

Direction (Compass point)	Exact equivalent in degrees true	Code figure	Direction (Compass point)	Exact equivalent in degrees true	Code figure
Calm	—	00			
N'E	11¼	01	S'W	191¼	19
NNE	22½	02	SSW	202½	20
NE'N	33¾	03	SW'S	213¾	21
NE	45	05	SW	225	23
NE'E	56¼	06	SW'W	236¼	24
ENE	67½	07	WSW	247½	25
E'N	78¾	08	W'S	258¾	26
E	90	09	W	270	27
E'S	101¼	10	W'N	281¼	28
ESE	112½	11	WNW	292½	29
SE'E	123¾	12	NW'W	303¾	30
SE	135	14	NW	315	32
SE'S	146¼	15	NW'N	326¼	33
SSE	157½	16	NNW	337½	34
S'E	168¾	17	N'W	348¾	35
S	180	18	N	360	36

ff Wind speed equivalent of Beaufort numbers **Table 7**

Beaufort force number	Description	Equivalent speed in knots*	
		Mean	Limits
0	Calm	0	< 1
1	Light air	2	1 – 3
2	Light breeze	5	4 – 6
3	Gentle breeze	9	7 – 10
4	Moderate breeze	13	11 – 16
5	Fresh breeze	19	17 – 21
6	Strong breeze	24	22 – 27
7	Near gale	30	28 – 33
8	Gale	37	34 – 40
9	Strong gale	44	41 – 47
10	Storm	52	48 – 55
11	Violent storm	60	56 – 63
12	Hurricane	—	⩾ 64

*These values may need to be corrected if the effective height of the anemometer is other than 10 m.

s_n Sign of temperature **Table 8**

Code figure	
0	Temperature positive or zero
1	Temperature negative

Table 11

ww	**Present weather**
ww = 00 – 49	*No precipitation at the station at the time of observation*
ww = 00 – 19	No precipitation, fog, ice fog (except for 11 and 12). duststorm, sandstorm, drifting or blowing snow at the station at the time of observation or, except for 09 and 17, during the preceding hour

Code figure

00 Cloud development not observed or not observable
01 Clouds generally dissolving or becoming less developed
02 State of sky on the whole unchanged
03 Clouds generally forming or developing
} characteristic change of the state of sky during the past hour

04 Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes
05 Haze
06 Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation
07 Dust or sand raised by wind at or near the station at the time of observation, but no well-developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen: or, in the case of ships, blowing spray at the station
08 Well-developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the time of observation, but no duststorm or sandstorm
09 Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour
10 Mist
11 Patches of
12 More or less continuous
} shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 metres on land or 10 metres at sea

13 Lightning visible, no thunder heard
14 Precipitation within sight, not reaching the ground or the surface of the sea
15 Precipitation within sight, reaching the ground or the surface of the sea, but distant, i.e. estimated to be more than 5 km from the station

16 Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station
17 Thunderstorm, but no precipitation at the time of observation
18 Squalls
19 Funnel cloud(s)* or tuba
} at or within sight of the station during the preceding hour or at the time of observation

ww = 20 – 29	Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour but not at the time of observation

20 Drizzle (not freezing) or snow grains
21 Rain (not freezing)
22 Snow
23 Rain and snow or ice pellets
24 Freezing drizzle or freezing rain
} not falling as shower(s)

25 Shower(s) of rain
26 Shower(s) of snow, or of rain and snow
27 Shower(s) of hail†, or of rain and hail†
28 Fog or ice fog
29 Thunderstorm (with or without precipitation)

ww = 30 – 39	Duststorm, sandstorm, drifting or blowing snow

30 Slight or moderate duststorm or sandstorm — has decreased during the preceding hour
31 Slight or moderate duststorm or sandstorm — no appreciable change during the preceding hour
32 Slight or moderate duststorm or sandstorm — has begun or has increased during the preceding hour
33 Severe duststorm or sandstorm — has decreased during the preceding hour
34 Severe duststorm or sandstorm — no appreciable change during the preceding hour
35 Severe duststorm or sandstorm — has begun or has increased during the preceding hour

36	Slight or moderate drifting snow	generally low (below eye level)
37	Heavy drifting snow	
38	Slight or moderate blowing snow	generally high (above eye level)
39	Heavy blowing snow	

ww = 40 – 49	Fog or ice fog at the time of observation

40	Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer	
41	Fog or ice fog in patches	
42	Fog or ice fog, sky visible	has become thinner during the preceding hour
43	Fog or ice fog, sky invisible	
44	Fog or ice fog, sky visible	no appreciable change during the preceding hour
45	Fog or ice fog, sky invisible	
46	Fog or ice fog, sky visible	has begun or has become thicker during the preceding hour
47	Fog or ice fog, sky invisible	
48	Fog, depositing rime, sky visible	
49	Fog, depositing rime, sky invisible	

ww = 50 – 99	*Precipitation at the station at the time of observation*
ww = 50 – 59	Drizzle

50	Drizzle, not freezing, intermittent	slight at time of observation
51	Drizzle, not freezing, continuous	
52	Drizzle, not freezing, intermittent	moderate at time of observation
53	Drizzle, not freezing, continuous	
54	Drizzle, not freezing, intermittent	heavy (dense) at time of observation
55	Drizzle, not freezing, continuous	
56	Drizzle, freezing, slight	
57	Drizzle, freezing, moderate or heavy (dense)	
58	Drizzle and rain, slight	
59	Drizzle and rain, moderate or heavy	

ww = 60 – 69	Rain

60	Rain, not freezing, intermittent	slight at time of observation
61	Rain, not freezing, continuous	
62	Rain, not freezing, intermittent	moderate at time of observation
63	Rain, not freezing, continuous	
64	Rain, not freezing, intermittent	heavy at time of observation
65	Rain, not freezing, continuous	
66	Rain, freezing, slight	
67	Rain, freezing, moderate or heavy	
68	Rain or drizzle and snow, slight	
69	Rain or drizzle and snow, moderate or heavy	

ww = 70 – 79	Solid precipitation not in showers

70	Intermittent fall of snowflakes	slight at time of observation
71	Continuous fall of snowflakes	
72	Intermittent fall of snowflakes	moderate at time of observation
73	Continuous fall of snowflakes	
74	Intermittent fall of snowflakes	heavy at time of observation
75	Continuous fall of snowflakes	
76	Diamond dust (with or without fog)	
77	Snow grains (with or without fog)	
78	Isolated star-like snow crystals (with or without fog)	
79	Ice pellets	

ww = 80 – 99	Showery precipitation, or precipitation with current or recent thunderstorm

80	Rain shower(s), slight	
81	Rain shower(s), moderate or heavy	
82	Rain shower(s), violent	
83	Shower(s) of rain and snow mixed, slight	
84	Shower(s) of rain and snow mixed, moderate or heavy	
85	Snow shower(s), slight	
86	Snow shower(s), moderate or heavy	
87	Shower(s) of snow pellets or small	—slight
88	hail with or without rain or rain and snow mixed	—moderate or heavy
89	Shower(s) of hail, with or without	—slight
90	rain or rain and snow mixed, not associated with thunder	—moderate or heavy

91	Slight rain at time of observation	thunderstorm during the preceding hour but not at time of observation
92	Moderate or heavy rain at time of observation	
93	Slight snow, or rain and snow mixed, or hail† at time of observation	
94	Moderate or heavy snow, or rain and snow mixed, or hail† at time of observation	
95	Thunderstorm, slight or moderate, without hail† but with rain and/or snow at time of observation	thunderstorm at time of observation
96	Thunderstorm, slight or moderate, with hail† at time of observation	
97	Thunderstorm, heavy, without hail† but with rain and/or snow at time of observation	
98	Thunderstorm combined with duststorm or sandstorm at time of observation	
99	Thunderstorm, heavy, with hail† at time of observation	

*Often associated with spouts.
†Hail, small hail, snow pellets.

W_1W_2 Past weather **Table 12**

Code figure	
0	Cloud covering ½ or less of the sky throughout the appropriate period
1	Cloud covering more than ½ of the sky during part of the appropriate period and covering ½ or less during part of the period
2	Cloud covering more than ½ of the sky throughout the appropriate period
3	Sandstorm, duststorm or blowing snow
4	Fog or ice fog or thick haze (visibility less than 1000 m)
5	Drizzle
6	Rain
7	Snow, or rain and snow mixed
8	Shower(s)
9	Thunderstorm(s) with or without precipitation

The following table shows the period to which W_1W_2 refers in reports made at main and intermediate hours.

Observation time	Period for W_1W_2
0000	...1800 – 0000
0300	...0000 – 0300
0600	...0000 – 0600
0900	...0600 – 0900
1200	...0600 – 1200
1500	...1200 – 1500
1800	...1200 – 1800
2100	...1800 – 2100

C Type of cloud **Table 19**

Code figure		Code figure	
0	Cirrus (Ci)	5	Nimbostratus (Ns)
1	Cirrocumulus (Cc)	6	Stratocumulus (Sc)
2	Cirrostratus (Cs)	7	Stratus (St)
3	Altocumulus (Ac)	8	Cumulus (Cu)
4	Altostratus (As)	9	Cumulonimbus (Cb)
/	Cloud not visible owing to darkness, fog, duststorm, sandstorm, or other similar phenomena		

h_sh_s Height of cloud

Table 20

Code figure	Height ft	Height m
00	< 100	< 30
01	100	30
02	200	60
03	300	90
04	400	120
05	500	150
06	600	180
07	700	210
08	800	240
09	900	270
10	1000	300
11	1100	330
12	1200	360
13	1300	390
14	1400	420
15	1500	450
16	1600	480
17	1700	510
18	1800	540
19	1900	570
20	2000	600
21	2100	630
22	2200	660
23	2300	690
24	2400	720
25	2500	750
26	2600	780
27	2700	810
28	2800	840
29	2900	870
30	3000	900
31	3100	930
32	3200	960
33	3300	990
34	3400	1020
35	3500	1050
36	3600	1080
37	3700	1110
38	3800	1140
39	3900	1170
40	4000	1200
41	4100	1230
42	4200	1260
43	4300	1290
44	4400	1320
45	4500	1350
46	4600	1380
47	4700	1410
48	4800	1440
49	4900	1470
50	5000	1500
51	not used	
52		
53		
54		
55		
56	6000	1800
57	7000	2100
58	8000	2400
59	9000	2700
60	10 000	3 000
61	11 000	3 300
62	12 000	3 600
63	13 000	3 900
64	14 000	4 200
65	15 000	4 500
66	16 000	4 800
67	17 000	5 100
68	18 000	5 400
69	19 000	5 700
70	20 000	6 000
71	21 000	6 300
72	22 000	6 600
73	23 000	6 900
74	24 000	7 200
75	25 000	7 500
76	26 000	7 800
77	27 000	8 100
78	28 000	8 400
79	29 000	8 700
80	30 000	9 000
81	35 000	10 500
82	40 000	12 000
83	45 000	13 500
84	50 000	15 000
85	55 000	16 500
86	60 000	18 000
87	65 000	19 500
88	70 000	21 000
89	> 70 000	> 21 000

Code figure	Height ft	Height m
90	< 150	< 50
91	150–300	50–100
92	300–600	100–200
93	600–1000	200–300
94	1000–2000	300–600
95	2000–3000	600–1000
96	3000–5000	1000–1500
97	5000–6500	1500–2000
98	6500–8000	2000–2500
99	⩾ 8000 or no clouds	⩾ 2500 or no clouds

NOTES: (1) If the height of the cloud base is between two of the heights given in the table the code figure for the lower height is reported, e.g. a cloud height of 450 ft is reported as 04.

(2) In the decade 90–99 a height exactly equal to one of the heights in the table is reported by the higher code figures, e.g. a height of 2000 ft is reported by code figure 95. This decade should be used only on those occasions when the height of the cloud base cannot be determined with greater accuracy.

Part II

Code tables for use in National Climatological Message

s_n	Sign of temperature	Table 8
E	State of ground without snow or measurable ice cover	Table 16
E′	State of ground with snow or measurable ice cover ...	Table 17
E_c	State of concrete slab	Table 22
H	Day of hail, ice, etc.	Table 23
S	Day of snow or sleet	Table 24
$sss, s_ds_ds_d$	Depth of snow	Table 18

s_n Sign of temperature — Table 8

Code figure	
0	Temperature positive or zero
1	Temperature negative

E State of ground without snow or measurable ice cover — Table 16

Code figure	
0	Surface of ground dry (without cracks and no appreciable amount of dust or loose sand)
1	Surface of ground moist
2	Surface of ground wet (standing water in small or large pools on surface)
3	Flooded
4	Surface of ground frozen
5	Glaze on ground
6	Loose dry dust or sand not covering ground completely
7	Thin cover of loose dry dust or sand covering ground completely
8	Moderate or thick cover of loose dry dust or sand covering ground completely
9	Extremely dry with cracks

NOTES: (1) The definitions in the code for E for numbers 0 to 2 and 4 apply to representative bare ground and numbers 3 and 5 to 9 to an open representative area.

(2) In all instances the highest code figure applicable is to be reported.

E′ State of ground with snow or measurable ice cover — Table 17

Code figure	
0	Ground predominantly covered by ice
1	Compact or wet snow (with or without ice) covering less than one-half of the ground
2	Compact or wet snow (with or without ice) covering at least one-half of the ground but ground not completely covered
3	Even layer of compact or wet snow covering ground completely
4	Uneven layer of compact or wet snow covering ground completely
5	Loose dry snow covering less than one-half of the ground
6	Loose dry snow covering at least one-half of the ground (but not completely)
7	Even layer of loose dry snow covering ground completely
8	Uneven layer of loose dry snow covering ground completely
9	Snow covering ground completely; deep drifts

NOTES: (1) The definitions in the code E′ apply to an open representative area.
(2) In all instances the highest code figure applicable is to be reported.
(3) In the above code table, whenever reference is made to ice it also includes solid precipitation other than snow.
(4) An entry is required for E *or* E′, a solidus (/) is entered for the non-recorded value.

E_c State of concrete slab — Table 22

Code figure	
0	Slab dry
1	Slab moist
2	Slab wet
3	Slab icy

NOTE: When state of ground E is reported as code figure 4 to 9, E_c will be transmitted as a solidus '/'.

H Day of hail, ice, etc. — Table 23

Code figure	
0	No hail, ice, etc.
1	Diamond dust
2	Snow grains
3	Snow pellets
4	Ice pellets
5	Hail (diameter 5 – 9 mm)
6	Hail (diameter 10 – 19 mm)
7	Hail (diameter 20 mm or more)

S Day of snow or sleet — Table 24

Code figure	
0	No snow or sleet
1	Sleet
5	Snow

NOTE: When sleet and snow are observed on the same day the entry is 5. Entries are to be made even when the fall yields no measurable amount in the rain-gauge.

sss/$s_ds_ds_d$ Depth of snow — Table 18

Code figure	cm
001	1
002	2
...	...
996	996
997	Less than ½
998	Snow cover, not continuous
999	Measurement impossible or inaccurate

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