



SKYWARN
UNITED KINGDOM

Spotter Hand Book

Edition 2

To the SkyWarn UK Spotter:

Severe weather! Its effects are felt by most of us during our lifetimes. To obtain critical information, SkyWarn UK has established a network of severe weather spotters across the United Kingdom. As a Registered SkyWarn UK Spotter you are essential in providing information on severe local storms. This guide has been compiled to assist you in the important task of observing and reporting severe weather. It also includes safety information to protect yourself and others when severe weather strikes. I hope you find this guide of use, and extend my sincere thanks to you for becoming one of the growing number of SkyWarn UK spotters – at the forefront of severe weather observing, reporting, and awareness.

Richard Byett

Executive and Founder
SkyWarn UK

This hand book has been designed to allow you to find basic information quickly. SkyWarn UK may make revisions to current pages, or add further pages to this book, and will make these available for download from the SkyWarn UK website. The contents of this version (Version 2) are as follows:

- 1) Alert, Activation, and Reporting Criteria
- 2) Terms and Definitions
- 3) Tornado and Hailstorm Scales
- 4) Thunderstorm Hazards and Safety Tips
- 5) Visual Clues to Storm Strength and Organisation
- 6) Visual Clues to Storm Strength and Organisation – Graphic
- 7) Spotter Safety



Spotter Reference Card 1:
Alert, Activation, and Reporting Criteria

SkyWarn UK has specific criteria for activating the spotter network, issuing alerts, and collecting reports. Spotters are automatically activated whenever an Amber or Red alert is issued. Alerts are normally issued up to 24 hours in advance of the onset of the expected weather event. Additionally, the type of alert signifies both the potential severity and the likelihood of the event occurring. The three tier alert level is as follows:

Green – Thunderstorms are not forecast; Severe wind gusts or disruptive precipitation is not forecast. The spotter network is not activated.

Amber – Thunderstorms are forecast, with a low risk of these becoming severe; Widespread and potentially disruptive rainfall or snowfall, not associated with thunderstorms, is forecast; Frequent and widespread wind gusts of at least 60 mph, not associated with thunderstorms, are forecast. The spotter network is activated.

Red – Thunderstorms are forecast, with a moderate to high likelihood of these becoming severe; Widespread and frequent damaging wind gusts in excess of 80 mph, not associated with thunderstorms, are forecast. The spotter network is activated.

When an Amber or Red alert is issued, spotters are requested to submit reports based on the criteria given in the table below.

	Thunderstorms forecast:			Not thunderstorm related:			
	Severe thunderstorm risk:			Wind gusts:		Widespread, disruptive:	
	Low	Moderate	High	60+ mph	80+ mph	Rain	Snow
Alert Level:	Amber	Red	Red	Amber	Red	Amber	Amber
Please Report:							
Tornado	Yes	Yes	Yes	No	No	No	No
Funnel Cloud	Yes	Yes	Yes	No	No	No	No
Wall cloud	Yes	Yes	Yes	No	No	No	No
Waterspout	Yes	Yes	Yes	No	No	No	No
Hail over 20 mm dia	Yes	Yes	Yes	No	No	No	No
Gusts over 55 mph	Yes	Yes	Yes	No	No	No	No
Gusts over 60 mph	Yes	Yes	Yes	Yes	Yes	No	No
Gusts over 80 mph	Yes	Yes	Yes	Yes	Yes	No	No
Rain accumulation	Only if over 25 mm / hr			No	No	Yes	No
Snow accumulation	Only if thundersnow			No	No	No	Yes
Related damage	Yes	Yes	Yes	Yes	Yes	Yes	Yes



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Spotter Reference Card 2:

Terms and definitions

SkyWarn UK uses set terms and definitions for severe weather as set out below. These are based on definitions used by other organisations including the UK Met. Office, the Tornado and Storm Research Organisation (TORRO), and the European Severe Storms Laboratory (ESSL).

Activation – Request to spotters to be alert to, observe, and report on a given severe weather event.

Alert – Notification that a given severe weather event is expected or occurring.

Funnel Cloud – A rotating, funnel shaped cloud extending downward from the cloud base, but not in contact with the ground.

Large Hail – Hailstones of at least 20 mm in diameter. Hailstones smaller than 20 mm are still capable of causing damage.

Multicell Thunderstorm – A collection of thunderstorm cells, often at differing stages of development

Multicell Line / Squall Line – A nearly continuous line of thunderstorms, often located along or just ahead of a cold front

Rainfall (widespread, heavy, disruptive) – Rainfall likely to lead to significant flash flooding or river flooding, and presenting a hazard to life and property

Severe Thunderstorm – A thunderstorm accompanied by one or more of the following: 1) One or more tornadoes and / or one or more waterspouts; 2) Hail of at least 20 mm in diameter (**large hail**); 3) Winds gusting in excess of 55 mph.

Shelf Cloud – An area of cloud, sometimes wedge shaped or rolling, located along the leading edge of the thunderstorm gustfront, and sloping down and away from the precipitation area.

Snowfall (widespread, heavy, disruptive) – Snowfall likely to lead to widespread travel disruption

Spotter – A person who observes and reports on severe weather. A Registered SkyWarn UK Spotter is somebody who has completed basic training with SkyWarn UK.

Spotter Network – A network of spotters located across the UK.

Supercell Thunderstorm – An unusually strong thunderstorm characterised by a persistent rotating updraft (**mesocyclone**)

Tornado – A violently rotating column of air joined to the cloud base and extending to the ground.

Wall Cloud – An isolated lowering of the cloud base, often in the area where there is little or no precipitation.

Waterspout – A tornado that occurs over water.



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Spotter Reference Card 3:

Tornado and Hailstorm Scales

SkyWarn UK uses the International Tornado Intensity Scale and the TORRO Hailstorm Intensity Scale, both of which are summarised below:

Tornado Scale:

T Number	Winds (mph)	Damage
T0	39 – 54	Negligible. Twigs snapped; Wheelies bins tipped; Loose slates dislodged
T1	55 – 72	Minor roof damage; wooden fences flattened
T2	73 – 92	Moderate roof damage; small trees uprooted; sheds destroyed; mobile homes dislodged
T3	93 – 114	Mobile homes overturned; large trees snapped or uprooted; roofs stripped
T4	115 – 136	Cars levitated; mobile homes destroyed; gable ends torn down; traffic signs twisted
T5	137 – 160	Entire roofs removed; older, weaker buildings collapse; utility poles snapped
T6	161 – 186	Strongly built houses sustain major damage; pylons twisted; bricks and blocks become airborne
T7	187 – 212	Trains thrown over; brick and wooden framed houses demolished; trees debarked
T8	213 – 240	Cars carried great distances; steel framed factory units severely damaged or destroyed
T9	241 – 269	Trains hurled great distances; steel framed buildings demolished; survival reliant on shelter below ground
T10	270 – 299	Entire frame houses lifted from foundations and carried great distances; severe destruction resulting in track devoid of vegetation, trees, and man-made structures.

Hailstorm Scale:

Category	Diameter (mm)*	Damage Impacts
H0	5	None
H1	5 – 15	Slight damage to plants and crops
H2	10 – 20	Significant damage to fruit, plants, and crops
H3	20 – 30	Damage to glass, plastic; paint scored
H4	25 – 40	Widespread damage to glass; cars damaged
H5	30 – 50	Destruction of glass; tiled roofs damaged; significant risk of injury
H6	40 – 60	Brick walls pitted; significant risk of injury
H7	50 – 75	Severe roof damage; risk of severe injuries
H8	60 – 90	Severe, widespread damage; most severe recorded in the UK
H9	75 – 100	Extensive structural damage; risk of fatal injuries
H10	100>	

*Approximate range (typical maximum value given in bold)



Lightning

- Occurs in all thunderstorms
- Between 30 and 60 people are struck in the UK each year. Of these, 3 – 6 will die.
- Remain in your vehicle or indoors whenever possible
- If outdoors, try not to be the tallest object, or near the tallest object

Flash flooding

- Do not drive through flood water unless you know:
 1. The water is less than a few inches deep
 2. The road is intact beneath the water
 3. The water is not moving
- Is especially dangerous at night when you may be unable to see flooded surfaces
- If your car becomes caught in flood water and stalls, leave immediately and move to dry ground

Hail

- Large, damaging hail is relatively rare in the UK.
- Seek shelters indoors, away from windows
- A hardtop car will provide protection up to around golf ball size hail. After that, damage will be sustained to glass and bodywork

Downbursts / Outflow Winds

- Occurs in stronger thunderstorms
- Winds may reach or even exceed 100 mph
- If driving, keep a firm grip on the wheel. Wind speed and direction may change very suddenly.
- Downbursts / outflow winds may be accompanied by heavy rain or hail
- If indoors, move away from windows as the downburst approaches

Tornadoes

- Around 40 occur each year in the UK, on average
- May cause significant damage and risk of injury
- Always try and observe from a safe distance – at least 1 to 2 miles from the main updraft area of a storm
- Know your area and have an escape route planned
- If you can't escape an oncoming tornado take shelter in a ditch or ravine, lying flat, and covering your head with your hands



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Spotter Reference Card 5: (This card should be used in conjunction with Spotter Reference Card 6)

Visual Clues to Storm Strength and Organisation

Upper Level Storm Clues

These clues are best observed from a distance of 30 to 40 miles away, and therefore need good visibility. Look for:

- An anvil with a crisp, well defined edge indicates a strong updraft. Weaker updrafts will give an anvil that is thin and wispy in appearance.
- A persistent overshooting top. If this persists for more than 10 minutes it shows the updraft is very strong, and the storm may possess a rotating updraft or mesocyclone.

Mid Level Storm Clues

These clues are best observed from a distance of 10 to 20 miles, and mostly centred on the storm's tower region. Look for:

- A solid appearing updraft tower, with a well defined cauliflower-like appearance. Weaker storms will have a more 'mushy' and less defined appearance, and are less likely to produce severe weather.
- A flanking line. This is a row of small towers that builds up in to the main tower, often from the south or southwest. Although not an indicator of updraft strength, it shows a level of organisation likely to lead to severe weather.

Low Level Storm Clues

These clues are best seen within a distance of 10 miles. They are also the most vital for establishing a storm's potential to produce severe weather. Look for:

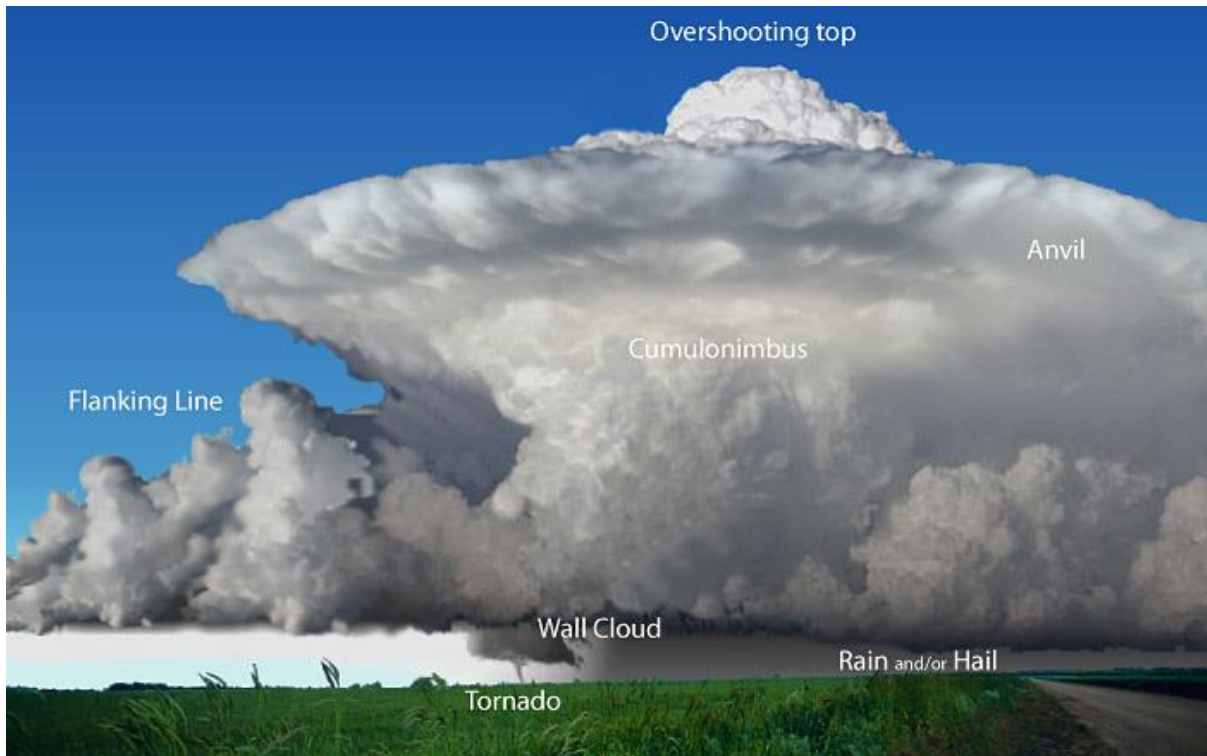
- The rain free base. This is a low, flat cloud base from which little precipitation is falling. This area identifies the storm's main inflow and updraft area of the storm. The area near and just north and east of the rain free base is most favoured for severe weather.
- The wall cloud. An isolated lowering of the rain free base, attached to the cloud base. This identifies the area of strongest updraft strength. Wall clouds that are rotating, particularly those lasting longer than 10 minutes, indicate a particularly dangerous storm capable of producing large hail, damaging winds, and tornadoes.



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Spotter Reference Card 6:

Visual Clues to Storm Strength and Organisation - Graphic





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Spotter Reference Card 7:

Spotter Safety

For Mobile Spotters

If you are observing the weather outdoors and away from your usual home address, you should bear the following safety points in mind:

- If possible have somebody travelling with you. They'll be a useful second pair of eyes!
- Do not exceed the speed limit
- Avoid dirt tracks – they can become slick and muddy when wet
- If you stop to observe, pull your car off the road – but away from power lines
- Try to keep a 1 – 2 miles safety buffer zone between you and a thunderstorm
- Know the area and have an escape route available
- Do not drive through flood water on the road
- Do not be the tallest object, or near the tallest object in a thunderstorm
- In high winds avoid structures that may fall on or near you or your car

For Static Spotters

If observing severe weather from the comfort of your own home, these are some safety tips to keep in mind:

- Do not use the telephone during a thunderstorm
- Avoid contact with plumbing and pipe work during a thunderstorm
- In high winds or thunderstorms ensure all unnecessary electrical appliances are unplugged.
- During high winds and severe thunderstorms, stay away from windows