

# Co-op Weather Observation Quick Reference Guide



Please call the National Weather Service in Chanhassen, Minnesota if you have any questions, equipment issues, or need supplies. We are here 24 hours a day, 7 days a week to assist you.

## TEMPERATURE DATA

The Nimbus thermometer (image at right) has a 35-day memory. If your station is equipped with a temperature sensor:

- Record the **maximum and minimum temperature** (temp) which occurred during the past 24 hours to the nearest whole degree, in addition to the temp at the time of your observation (“at ob temp”).
  - The maximum (high) and minimum (low) temps are viewed by pressing and holding the Max/Min RECALL button.
  - The **“at ob temp”** (i.e. current temperature) will be displayed when no buttons are pressed.
  - Immediately after recording the “at ob temp”, push and hold the CLEAR button (to reset the recall data) until the display reads ‘E2E.2’, which takes about 5 seconds.
  
- If you are unable to record the temp data at your observation (“ob”) time, you can use the **Nimbus memory feature** to gather past data.
  - Flip the memory switch to on, then press RECALL and “0.0” will be displayed. Click RECALL again to view the high temp so far, since your ob time. Click RECALL again to see the time the high was set. Click RECALL again to see the low temp, then click RECALL again to see the time of the low.
  - Click RECALL again and “0.1” will be displayed, meaning the data to follow will be from the 24 hour period that is one day back (i.e. what would have been recorded at your last ob time). Continue to click RECALL to see the all of the data from one day back.
  - Then when you see “0.2”, you will be viewing data that is from two days back. Continue to click on RECALL until all of the needed past data are viewed. Flip the memory switch to “off” when you’re done.



During a power failure, the Nimbus automatically operates off a 9 volt battery. After a power failure, or at least once a year, the battery should be replaced. Contact the National Weather Service for replacement batteries.

## LIQUID PRECIPITATION

The two main pieces of equipment used for precipitation (“precip”) measurements are the standard 8 inch diameter rain gauge (SRG) and the Fisher & Porter rain gauge (FPR-E). Only a handful of sites have the FPR-E gauge in addition to the SRG. We will focus on measurements taken using the SRG (shown in image).

- **To measure rainfall in the SRG**, lift the funnel off the top of the gage, lift out the inner tube and insert the black measuring stick into the tube. Note the amount of rain to the nearest hundredth of an inch (i.e. 0.48 inches). The inner tube will fill completely when 2 or more inches of rain has fallen.
- **If the tube is completely full**, note 2 inches of precip, then dump out the liquid in the inner tube. Then take the funnel and place it over the top of the inner tube. Lift up the outer metal cylinder, and slowly pour the remaining water in the outer can into the funnel so it can be measured in the inner tube. Be careful not to spill any liquid. If you fill the tube up again, record another 2 inches of precip, then repeat the process. When all of the water has been measured, add the separate measurements together to get the final total. The total precip should be recorded as the 24 hour precip value.
- If no precip fell during the 24-hour period, enter 0.00. **If the amount was too small to measure, or evaporated before it reached the ground** (i.e. sprinkles), enter a “T” for trace. Condensation from fog/dew and frost does not count as precip.
- If you need to report a precipitation total that covers more than one day, please follow the instructions listed in the “How to Record a **Multi-Day Precipitation Total**” section below.



## SNOWFALL AND FROZEN PRECIPITATION

**Snowfall and snow depth should be reported each day, year round, even if it is zero.** During the rain season, only a precipitation values needs to be measured. The snowfall and snow depth total are entered as 0 during the rain season. The only exception is that hail would be recorded as a “T” (trace) in the snowfall column because it is considered frozen precipitation.

### **How to prepare the station for winter:**

- **In the fall when temperatures start to drop below freezing, remove the plastic funnel and inner tube from the rain gauge**, and store them inside to keep the plastic equipment from cracking when water freezes in the funnel.
- **Put a snowboard out** and mark the location with a flag or stake so it can be found when it snows. The snowboard is normally located near your rain gauge in a location that is not prone to drifting – and is away from trees, buildings, and other obstructions.



## How to Measure Snowfall:

Measure and record the amount of snow and sleet that accumulated on the snowboard during the past 24 hours to the nearest tenth of an inch, like 1.0 or 3.7 inches. If ice forms on the board (from freezing rain or drizzle), the depth of ice is not included in the snowfall measurement.

Make sure to wipe the snowboard clean (as shown in photo) after the measurement is taken to reset for the next 24 hour period.



- **Record amounts too small to measure**, such as flurries or snow that melted as it hit the ground, as a “T” for trace.
- **If snowfall accumulated, but melted before you took your daily observation**, if you know how much snow accumulated before it began to melt (or have a good estimate), report that total as your snowfall for the 24 hour period. If the snowfall is estimated, make sure to note that in remarks.
- **If the snow didn’t collect on the snowboard** (i.e. melted or blew away before it could be measured), an estimate of the snowfall can be made. Please call us for help with estimating snowfall, based on your precipitation amount. The ratio of snow to liquid varies with each event. If you enter a snowfall estimate, you must put “snowfall was estimated” in remarks.

- It is permissible to use another location on your property to measure the snowfall if a snowboard isn’t available, or the board didn’t capture the snowfall due to blowing and drifting, etc. **Possible alternate snowfall observing locations** include a deck, picnic table, sidewalk, driveway, or any spot that appears to have captured the recent snowfall accurately. Be sure that the alternate spot only includes snow that fell during the past 24 hours, and is not too close to a snow drift, building, fence, or other man-made structure that would influence measurements. Make sure to note in remarks where the snowfall measurement was taken if you didn’t use a snowboard.



## How to Measure Snow Depth:

Determine the total depth of snow, sleet, and ice on the ground at your ob time using the snow measuring stick. Take 4 to 6 snow depth readings on your property to get an average value. Record the average snow depth to the nearest inch. *Example: Less than ½ inch of snow depth is reported as “T” for trace; 3.5” is reported as 4”; and 1.2” is reported as 1”.*



- Do not take snow depth measurements in areas impacted by blown, plowed, or shoveled snow, or in snow drifts.
- **Do not report zero for snow depth if snow is on the ground.** Enter M for missing if a snow depth measurement isn't available.
- **When less than 50% of the ground is covered by snow,** even though covered areas may have significant depth, the snow depth is recorded as a "T" for trace.
- Wait until all but the man-made piles of snow are gone, before reporting the snow depth as zero.



## How To Measure Precipitation During Snow Season:

Measure and record the water equivalent of all of the precipitation (snow, sleet/ice pellets, freezing rain, freezing drizzle, and/or rain) that falls into the rain gauge during the snow season.

- To determine the water equivalent of the wintry precip, **melt the contents of the rain gauge by bringing it inside**, and allowing the frozen precip to melt. If precip is occurring at the time of your ob, you can dump the contents of your rain gauge into a bucket and bring the bucket inside, leaving the rain gauge outside to catch the falling precip.
- You can **speed up the melting process** by pouring a measured amount of hot water onto the wintry precip in the gauge (or bucket).
- **When everything is in liquid form**, pour the liquid into the rain gauge funnel and inner tube. Measure the liquid to the nearest hundredth of an inch using the rain gauge measuring stick. Be careful not to spill the water when pouring it into the funnel and inner tube. Make sure to subtract the amount of any hot water that was added from the total liquid measurement to get the final precip amount.
- **If the amount that fell was too small to measure**, such as a few light flurries, enter a "T" for trace for precip.

## How to Record a Multi-Day Precipitation Total:

In the event that you are unable to measure precip on a particular day (i.e., office is closed on the weekends; you are on vacation and a back-up observer is not available; dangerous weather conditions at your ob time, etc.), you can provide a **multi-day precip total**.

In **WXCODER**, use the “Multi-day Accumulation” drop down box next to the precipitation entry box to select the number of days the accumulated precip total is for. Here are examples of how to enter a multi-day precip report in **WXCODER**:

**Using the superform:**

A 3-day precip total is shown in the red box. For the two days prior to the total, when an ob is not available, an M is entered for the missing data. A 2-day precip total is shown in the blue box, with an M entered the previous day.

The monthly data entry form looks similar. However, we recommend using the superform because you don’t need to unlock the form or confirm the changes after saving them.

Precipitation	Multi-day Accumulation	Snowfall	Snow depth
0.00	1	0.0	0
0.00	1	0.0	0
0.00	1	0.0	0
0.03	1	0.0	0
0.00	1	0.0	0
0.19	1	0.0	0
T	1	0.0	0
M	1	M	M
M	1	M	M
0.29	3	2.0	2
M	1	M	M
0.86	2	10.0	12

**Using the daily entry page:**

A 3-day precipitation total is shown below. For the two days prior, M would be entered for the precipitation value, since an observation is not available on those two days.

▶ **Precipitation**

0.35

x.xx in

Reminder: set the accumulation if this value represents more than one observation period.

▶ **Multi-day Accumulation**

3

▼

days

▶ **Snowfall**

5.2

x.x in

▶ **Snow depth**

5

x in

## Weekly Snow Core Measurements

A snow core is the amount of water in the snow pack. This is an **optional observation** which is taken once a week (either Sunday or Monday) when 2 or more inches of snow is on the ground. The data are critical to providing accurate forecasts of flooding potential during the spring snowmelt.

The snow core measurement is reported in WxCoder using the daily entry page or superform. **Only enter a snow core value in WxCoder if a snow core is taken, otherwise leave it blank (please do not enter a 0).** If there is snow on the ground, and a zero is entered for the snow core, our computer models will assume there is no water in the snowpack at that location, which causes errors in forecasts and maps.



### How to take a snow core observation:

- At a location equal to your reported snow depth, turn the metal rain gauge can upside down and push it straight down through the snow, ensuring that you reach the ground. This may be a bit of a challenge if you have an ice layer in the snowpack. *Please note: The photo shows a clear plastic rain gauge to make it easier to see the snow inside.*
- If your snowpack is taller than the rain gauge you will need to take the core sample in pieces. To do this, push the rain gauge into the snowpack until the snow is just about to fill the can. Then move away enough of the surrounding snow so you can put a clipboard, spatula, etc. under the opening of the can to help you turn it over without losing any snow. Dump the snow you collect into a separate container like a bucket or trash can. Then take the empty rain gauge back to the same location, turn it upside down and push it back into the snow to gather the remainder of the snow down to the ground. Dump the additional snow into the bucket with the previous sample, so all of the snow can be melted down and measured.
- Take all of the collected snow inside and let it melt. Then pour the water into the rain gauge inner funnel and measure it with the rain gauge stick. Report this value as the snow core to the nearest tenth of an inch (i.e. 1.57" would be reported as 1.6").
- The snow can take a long time to melt from a core sample. You can add a measured amount of hot water to the snow to help speed up the melting process. Just remember to subtract the amount of hot water from the measurement to get the final snow core value.

