Rural Training Center – Thailand (RTC-TH)

FOCUS

Community-based Environmental Education for the Self-sufficiency and Sustainability of Small Rural Family Farms

Advanced MEWS Weather Observing Lesson A3:

Using Dew Point Temperature to Calculate Cloud Base Height

2012 Ed

Advanced Temperature measurements are needed to

- Dew Point Temperature
- Cloud Base Height

The topics below are covered in other Advanced MEWS lessons.

- Calculate Relative Humidity
- Heat Stress Index
- Wind Chill Temperature

You may want to review MEWS Lesson B1 & A1 about temperature measurement before proceeding.

A Mobile Emergency Weather Station (MEWS) Training Series presentation

Rural Training Center-Thailand
Emergency Communications Program

Ready to serve and sustain our community

For other lessons in the series e-mail hsØzhm@gmail.com
www.neighborhoodlink.com/RTC-TH_Tech/pages

A part of the RTC-TH EmComm Program

The Rural Training Center-Thailand Emergency Communications program is a volunteer effort to provide emergency amateur radio communications for local community self-sufficiency and sustainability in times of need.

The Rural Training Center-Thailand (RTC-TH)

is an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms

www.neighborhoodlink.com/org/rtcth

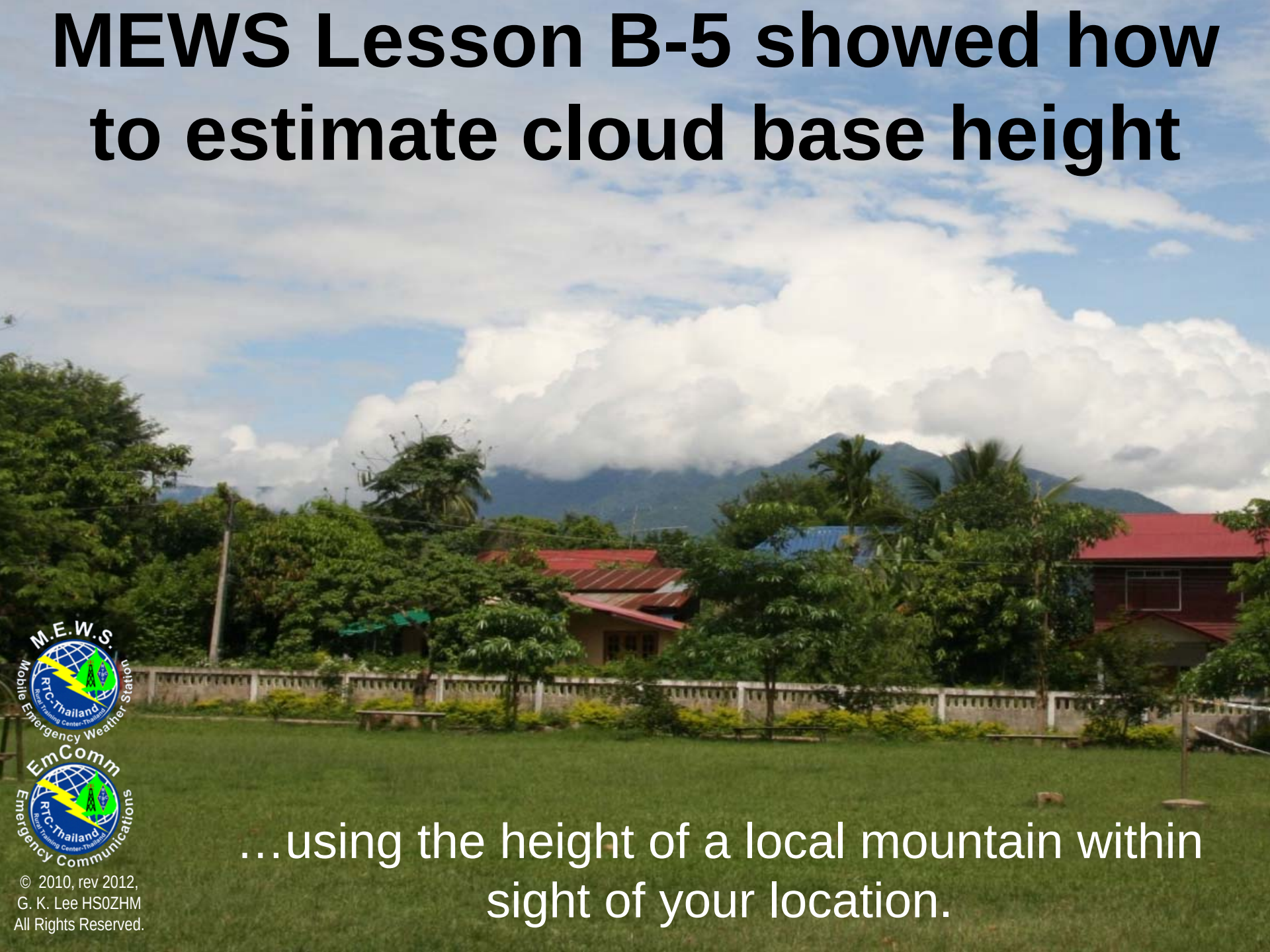
E-mail: rtc2k5@gmail.com

MEWS adapts weather lessons from two existing RTC-TH programs

E-mail: rtc2k5@gmail.com
www.neighborhoodlink.com/RTCTH_Tech/pages

The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan, a father, farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.

MEWS Lesson B-5 showed how to estimate cloud base height



…using the height of a local mountain within sight of your location.

Important Note

For MEWS purposes, most relief flights will be concerned with the lowest cloud layer.

Record and report the height of the cloud base for the lowest clouds in your area.

Report a Flight Advisory any time cloud base height is ***near to, at, or less*** than the warning limits listed on the Log Form.

This Lesson will teach you to calculate the cloud base height using the Dew Point Temperature

Here's what you need in order to do this lesson.

Calculator, pencil, MEWS Handbook & log sheet, and Dew Point Table.

Clouds can affect air flights into and out of the relief area.

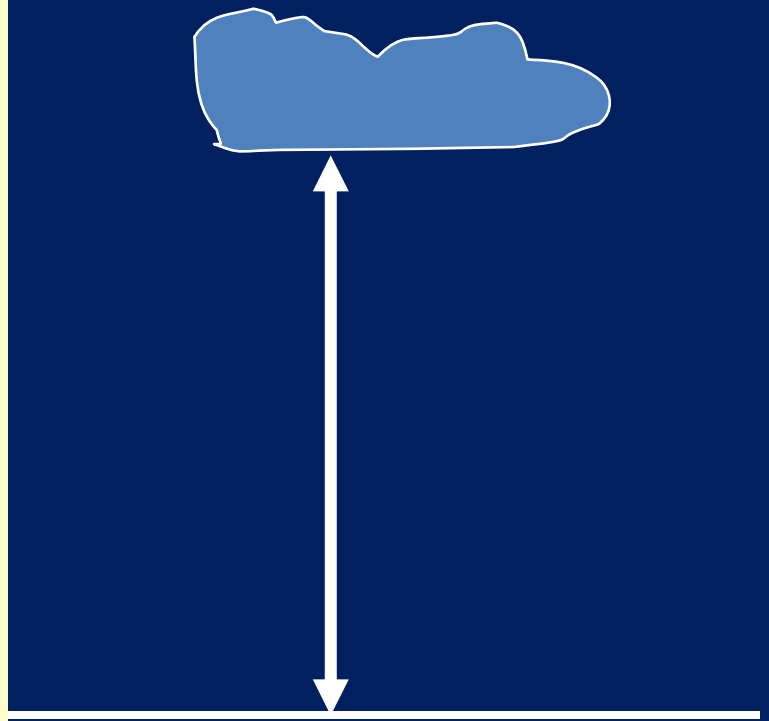
Photo from the Internet; educational fair use clause

Helicopters fly using visual flight rules; they must see where they are going. Most helicopters do not have radar.

Amateur radio operators with portable weather equipment can provide this information when there are no weather stations in the disaster area.

Knowing the relative humidity help you know the height of a cloud layer.

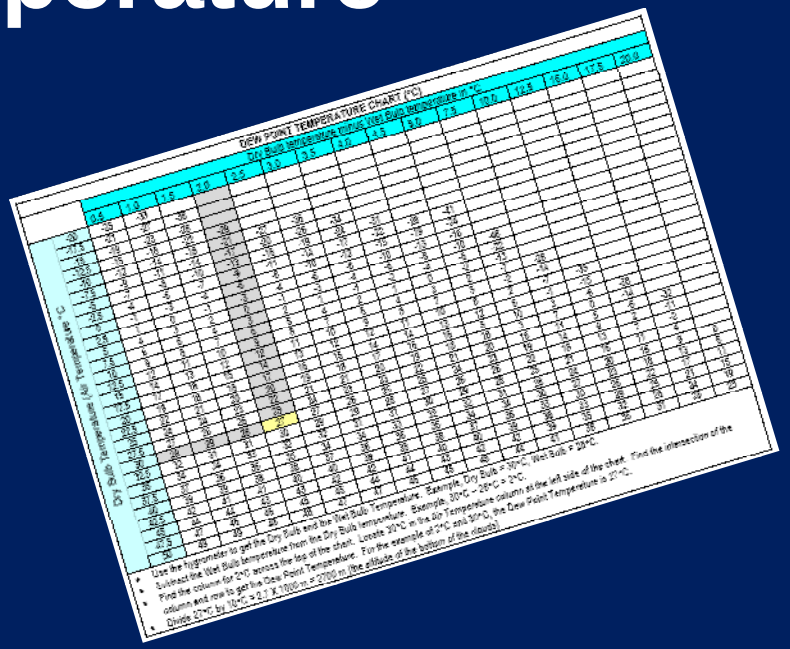
A low cloud ceiling (clouds that are close to the ground) can limit emergency relief flight operations. Knowing the Dew Point Temperature lets you calculate the height of the cloud base.



Calculating Cloud Base Height using the Dew Point Temperature

You need to know:

- the Air Temperature
- the Dew Point Temperature
- the dry lapse rate is 9.8°C / 1000m



You need to have the Dew Point Table

The chart can be found on p. 13 of the Handbook posted in PDF section of the the RTC-TH website (www.neighborhoodlink.com/RTC-TH_Tech/pages)

Calculating Cloud Base Height using the Dew Point Temperature

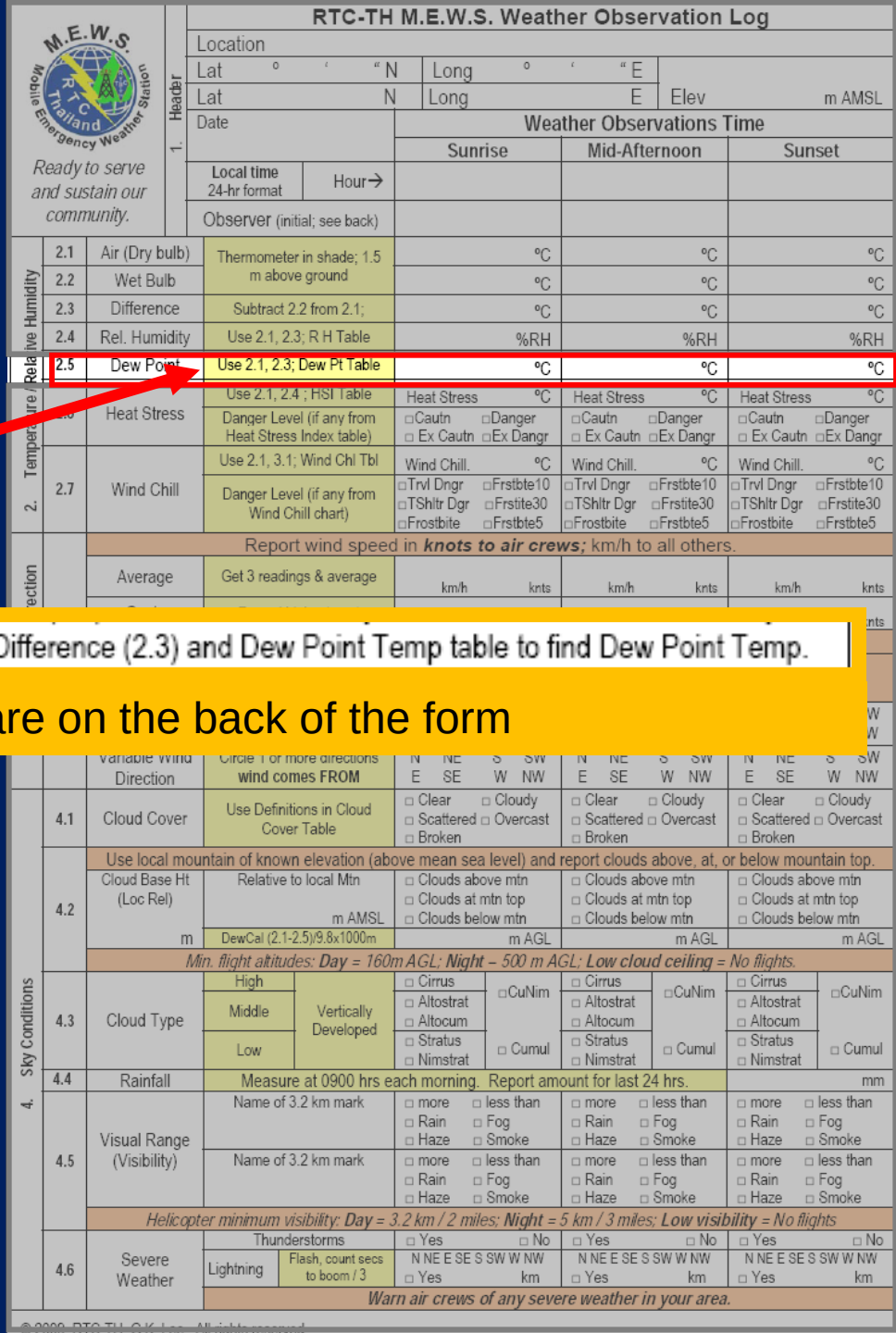
NOTE:

If you have measured the relative humidity, and you already know the Dew Point temperature, you can skip to Step 8 of the following procedure to calculate the cloud based height.

If you need to get the dew point temperature, go to the next slide.

Record the Dew Point Temperature in Section 2.5

Guide notes are on the front of the form



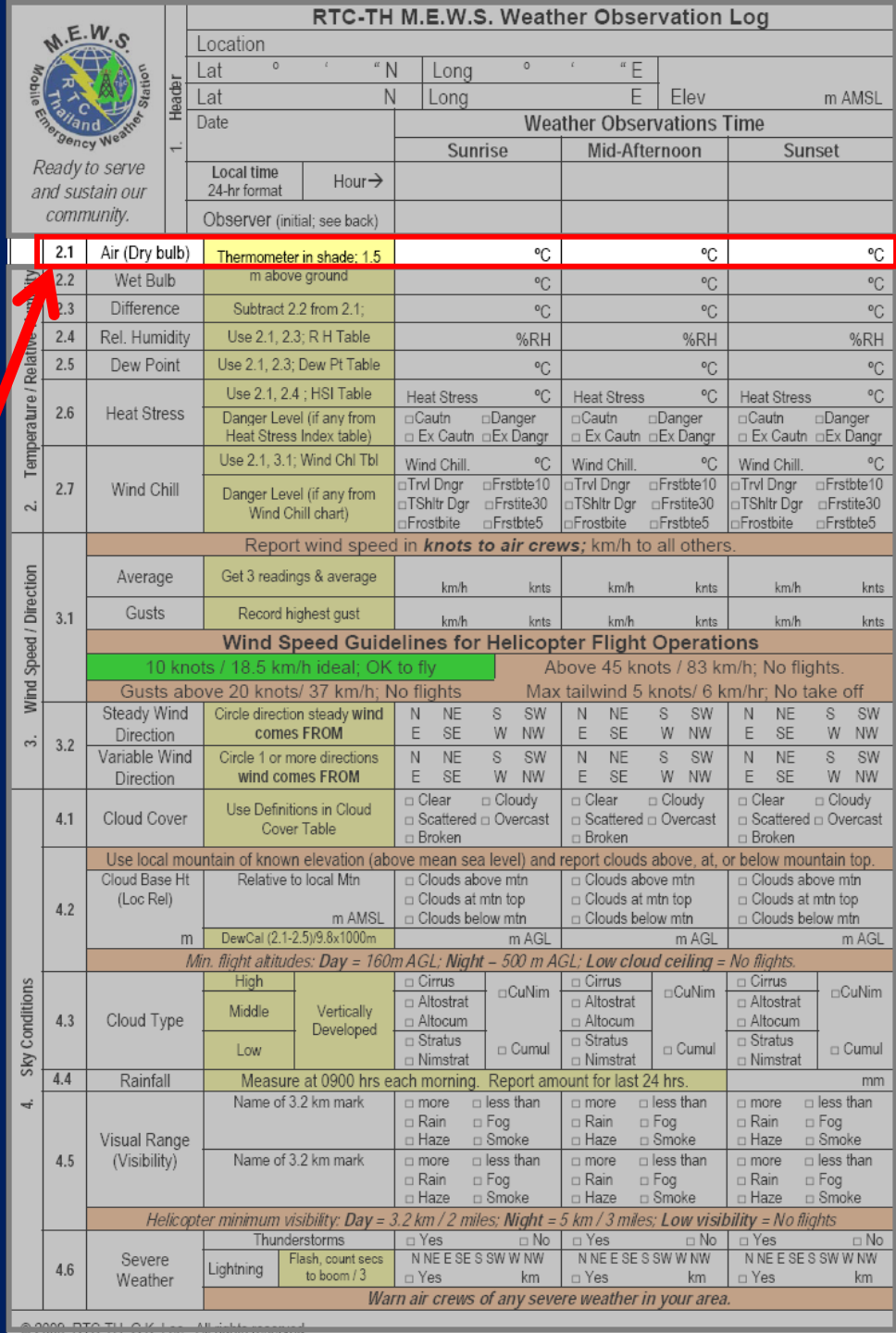
2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.

More details notes are on the back of the form

See Handbook Section 2.5, pp. 12-13

Finding the Dew Point Temperature

Step 1: Get the air temperature from the MEWS log sheet (Section 2.1)



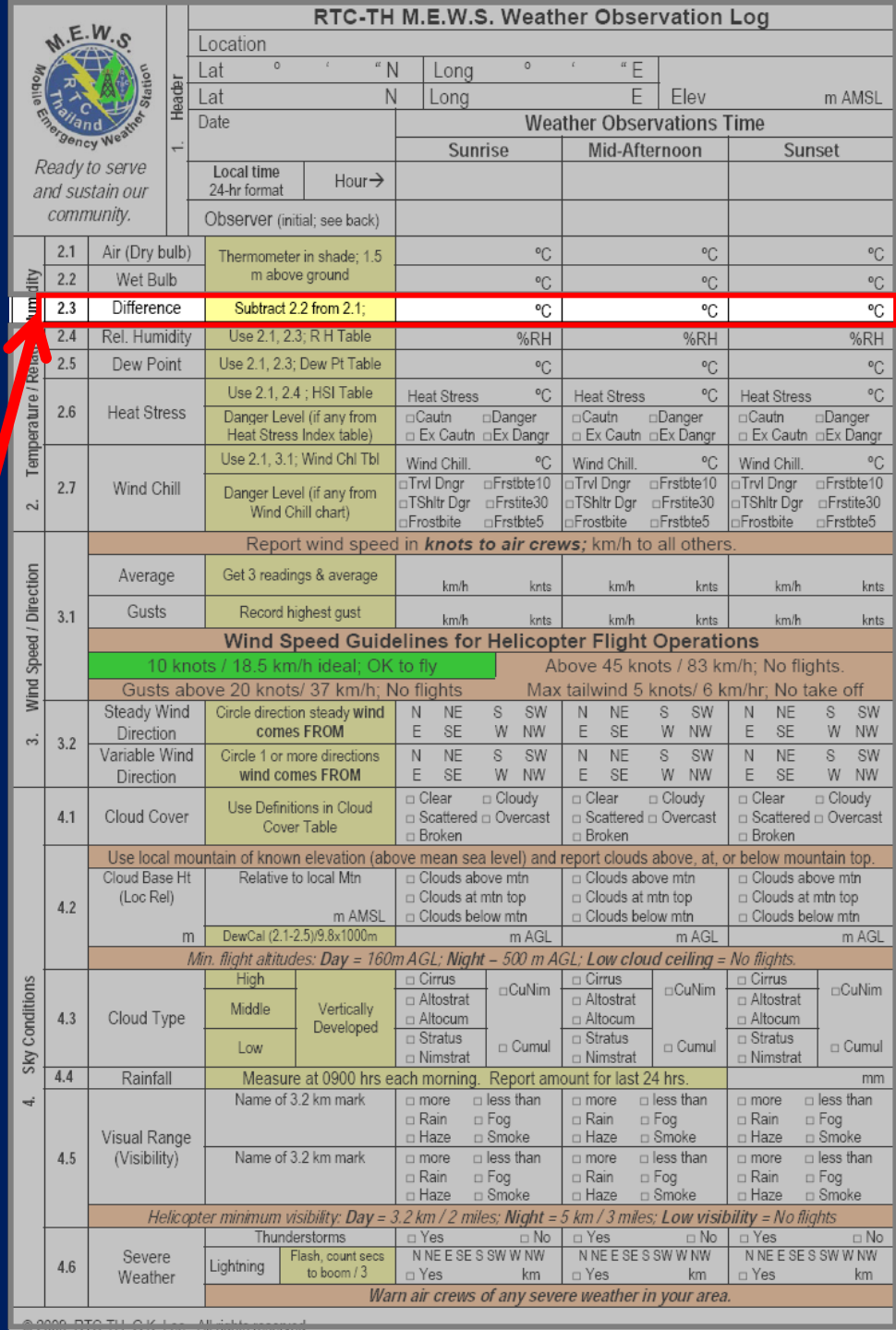
RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header	Location					
	Lat ° ' " N	Long ° ' " E				
	Lat N	Long E	Elev m AMSL			
	Date		Weather Observations Time	Sunrise	Mid-Afternoon	Sunset
	Local time 24-hr format	Hour→				
	Observer (initial; see back)					
2. Temperature / Relative Humidity	2.1 Air (Dry bulb)	Thermometer in shade; 1.5 m above ground		°C	°C	°C
	2.2 Wet Bulb			°C	°C	°C
	2.3 Difference	Subtract 2.2 from 2.1;		°C	°C	°C
	2.4 Rel. Humidity	Use 2.1, 2.3; R H Table		%RH	%RH	%RH
	2.5 Dew Point	Use 2.1, 2.3; Dew Pt Table		°C	°C	°C
	2.6 Heat Stress	Use 2.1, 2.4 ; HSI Table		Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)		□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7 Wind Chill	Use 2.1, 3.1; Wind Chl Tbl		Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)		□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
3. Wind Speed / Direction	Report wind speed in ***knots to air crews;*** km/h to all others.					
	3.1 Average	Get 3 readings & average		km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust		km/h knts	km/h knts	km/h knts
	Wind Speed Guidelines for Helicopter Flight Operations					
	10 knots / 18.5 km/h ideal; OK to fly			Above 45 knots / 83 km/h; No flights.		
	Gusts above 20 knots/ 37 km/h; No flights			Max tailwind 5 knots/ 6 km/hr; No take off		
	3.2 Steady Wind Direction	Circle direction steady **wind comes FROM**		N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**		N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1 Cloud Cover	Use Definitions in Cloud Cover Table		□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2 Cloud Base Ht (Loc Rel)	Relative to local Mtn m AMSL		□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	DewCal (2.1-2.5)/9.8x1000m	m AGL		m AGL	m AGL
	*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*					
	4.3 Cloud Type	High / Middle / Low	Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat / □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat / □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat / □CuNim □ Cumul
	4.4 Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.				mm
	4.5 Visual Range (Visibility)	Name of 3.2 km mark		□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark		□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
	*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*					
	4.6 Severe Weather	Thunderstorms		□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning / Flash, count secs to boom / 3		N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
	Warn air crews of any severe weather in your area.					

Finding the Dew Point Temperature

Step 2: Get the difference between the dry and wet bulb temperatures (Section 2.3)



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	Local time 24-hr format	Hour→				
	Observer (initial; see back)					
2. Temperature / Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
3. Wind Speed / Direction			Report wind speed in ***knots to air crews;*** km/h to all others.			
	3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
		Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
			Wind Speed Guidelines for Helicopter Flight Operations			
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			Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off	
	3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2		Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
		Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	m AMSL / DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
			*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*			
	4.3	Cloud Type	High / Middle / Low — Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul
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			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
			Warn air crews of any severe weather in your area.			

Finding the Dew Point Temperature

Step 3: Get the Dew Point Temperature Table from the MEWS Handbook

DEW POINT TEMPERATURE CHART (°C)

Dry Bulb Temperature (Air Temperature °C)	Dry Bulb temperature minus Wet Bulb temperature in °C															
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
-20	-25	-33														
-17.5	-21	-27	-35													
-15	-19	-23	-28													
-12.5	-15	-18	-22	-29												
-10	-12	-14	-18	-21	-27	-36										
-7.5	-9	-11	-14	-17	-20	-26	-34									
-5	-7	-8	-10	-13	-16	-19	-24	-31								
-2.5	-4	-6	-7	-9	-11	-14	-17	-22	-28	-41						
0	-1	-3	-4	-6	-8	-10	-12	-15	-19	-24						
2.5	1	0	-1	-3	-4	-6	-8	-10	-13	-16						
5	4	3	2	0	-1	-3	-4	-6	-8	-10	-48					
7.5	6	6	4	3	2	1	-1	-2	-4	-6	-22					
10	9	8	7	6	5	4	2	1	0	-2	-13					
12.5	12	11	10	9	8	7	6	4	3	2	-7	-28				
15	14	13	12	12	11	10	9	8	7	5	-2	-14				
17.5	17	16	15	14	13	12	12	11	10	8	2	-7	-35			
20	19	18	18	17	16	15	14	14	13	12	6	-1	-15			
22.5	22	21	20	20	19	18	17	16	15	5	10	3	-6	-38		
25	24	24	23	22	21	21	20	19	18	18	3	7	0	-14		
27.5	27	26	25	25	24	23	23	22	21	20	16	11	5	-5	-32	
30	29	29	28	27	27	26	25	25	24	23	19	14	9	2	-11	
32.5	32	31	31	30	29	29	28	27	26	26	22	18	13	7	-2	
35	34	34	33	32	32	31	31	30	29	28	25	21	16	11	4	
37.5	37	36	35	35	34	34	33	32	32	31	28	24	20	15	9	0
40	39	39	38	38	37	36	36	35	34	34	30	27	23	18	13	6
42.5	42	41	41	40	40	39	38	38	37	36	33	30	25	22	17	11
45	44	44	43	43	42	42	41	40	40	39	36	33	29	25	21	15
47.5	47	46	46	45	45	44	44	43	42	42	39	35	32	28	24	19
50	49	49	48	48	47	47	46	45	45	44	41	38	35	31	28	23

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
- Subtract the Wet Bulb temperature from the Dry Bulb temperature. Example, 30°C – 28°C = 2°C.
- Find the column for 2°C across the top of the chart. Locate 30°C in the Air Temperature column at the left side of the chart. Find the intersection of the column and row to get the Dew Point Temperature. For the example of 2°C and 30°C, the Dew Point Temperature is 27°C.
- Divide 27°C by 10°C = 2.7 X 1000 m = 2700 m (the altitude of the bottom of the clouds)

See Handbook p 13

Finding the Dew Point Temperature

Step 4: Find the dry bulb temperature in the left most column.

For this example, let's use 30° C

DEW POINT TEMPERATURE CHART (°C)

Dry Bulb Temperature (Air Temperature °C)	Dry Bulb temperature minus Wet Bulb temperature in °C															
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
-20	-25	-33														
-17.5	-21	-27	-38													
-15	-19	-23	-28													
-12.5	-15	-18	-22	-29												
-10	-12	-14	-18	-21	-27	-36										
-7.5	-9	-11	-14	-17	-20	-26	-34									
-5	-7	-8	-10	-13	-16	-19	-24	-31								
-2.5	-4	-5	-7	-9	-11	-14	-17	-22	-28	-41						
0	-1	-3	-4	-6	-8	-10	-12	-15	-19	-24						
2.5	1	0	-1	-3	-4	-6	-8	-10	-13	-16						
5	4	3	2	0	-1	-3	-4	-6	-8	-10	-48					
7.5	6	6	4	3	2	1	-1	-2	-4	-6	-22					
10	9	8	7	6	5	4	2	1	0	-2	-13					
12.5	12	11	10	9	8	7	6	4	3	2	-7	-28				
15	14	13	12	12	11	10	9	8	7	5	-2	-14				
17.5	17	16	15	14	13	12	12	11	10	8	2	-7	-35			
20	19	18	18	17	16	15	14	14	13	12	6	-1	-15			
22.5	22	21	20	20	19	18	17	16	15	5	10	3	-6	-38		
25	24	24	23	22	21	21	20	19	18	18	3	7	0	-14		
[illegible]	27	26	25	25	24	23	23	22	21	20	16	11	5	-6	-32	
30	29	29	28	27	27	26	25	25	24	23	19	14	9	2	-11	
[illegible]	32	31	31	30	29	29	28	27	26	26	22	18	13	7	-2	
35	34	34	33	32	32	31	31	30	29	28	25	21	16	11	4	
37.5	37	36	35	35	34	34	33	32	32	31	28	24	20	15	9	0
40	39	39	38	38	37	36	35	35	34	34	30	27	23	18	13	6
42.5	42	41	41	40	40	39	38	38	37	36	33	30	26	22	17	11
45	44	44	43	43	42	42	41	40	40	39	36	33	29	25	21	15
47.5	47	46	46	45	45	44	44	43	42	42	39	35	32	28	24	19
50	49	49	48	48	47	47	46	45	45	44	41	38	35	31	28	23

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
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- Divide 27°C by 10°C = 2.7 X 1000 m = 2700 m (the altitude of the bottom of the clouds)

Finding the Dew Point Temperature

Step 5: Find the dry bulb / wet bulb temperature difference in the row across the top.

For this example, let's use 2° C.

DEW POINT TEMPERATURE CHART (°C)

Dry Bulb Temperature (Air Temperature °C)	Dry Bulb temperature minus Wet Bulb temperature in °C															
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
-20	-25	-33														
-17.5	-21	-27	-35													
-15	-19	-23	-28													
-12.5	-15	-18	-22	-29												
-10	-12	-14	-18	-21	-27	-36										
-7.5	-9	-11	-14	-17	-20	-26	-34									
-5	-7	-8	-10	-13	-16	-19	-24	-31								
-2.5	-4	-5	-7	-9	-11	-14	-17	-22	-28	-41						
0	-1	-3	-4	-6	-8	-10	-12	-15	-19	-24						
2.5	1	0	-1	-3	-4	-6	-8	-10	-13	-16						
5	4	3	2	0	-1	-3	-4	-6	-8	-10	-48					
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10	9	8	7	6	5	4	2	1	0	-2	-13					
12.5	12	11	10	9	8	7	6	4	3	2	-7	-28				
15	14	13	12	12	11	10	9	8	7	5	-2	-14				
17.5	17	16	15	14	13	12	12	11	10	8	2	-7	-35			
20	19	18	18	17	16	15	14	14	13	12	6	-1	-15			
22.5	22	21	20	20	19	18	17	16	16	5	10	3	-6	-38		
25	24	24	23	22	21	21	20	19	18	18	3	7	0	-14		
27.5	27	26	25	25	24	23	23	22	21	20	16	11	5	-5	-32	
30	29	29	28	27	27	26	25	25	24	23	19	14	9	2	-11	
32.5	32	31	31	30	29	29	28	27	26	26	22	18	13	7	-2	
35	34	34	33	32	32	31	31	30	29	28	25	21	16	11	4	
37.5	37	36	36	35	34	34	33	32	32	31	28	24	20	15	9	0
40	39	39	38	38	37	36	36	35	34	34	30	27	23	18	13	6
42.5	42	41	41	40	40	39	38	38	37	36	33	30	25	22	17	11
45	44	44	43	43	42	42	41	40	40	39	36	33	29	25	21	15
47.5	47	46	46	45	45	44	44	43	42	42	39	35	32	28	24	19
50	49	49	48	48	47	47	46	45	45	44	41	38	35	31	28	23

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
- Subtract the Wet Bulb temperature from the Dry Bulb temperature. Example, 30°C – 28°C = 2°C.
- Find the column for 2°C across the top of the chart. Locate 30°C in the Air Temperature column at the left side of the chart. Find the intersection of the column and row to get the Dew Point Temperature. For the example of 2°C and 30°C, the Dew Point Temperature is 27°C.
- Divide 27°C by 10°C = 2.7 X 1000 m = 2700 m (the altitude of the bottom of the clouds)

Finding the Dew Point Temperature

Step 6: Find the dew point temperature in the chart where the row / column meet.

The Dew Point Temperature is 27° C.

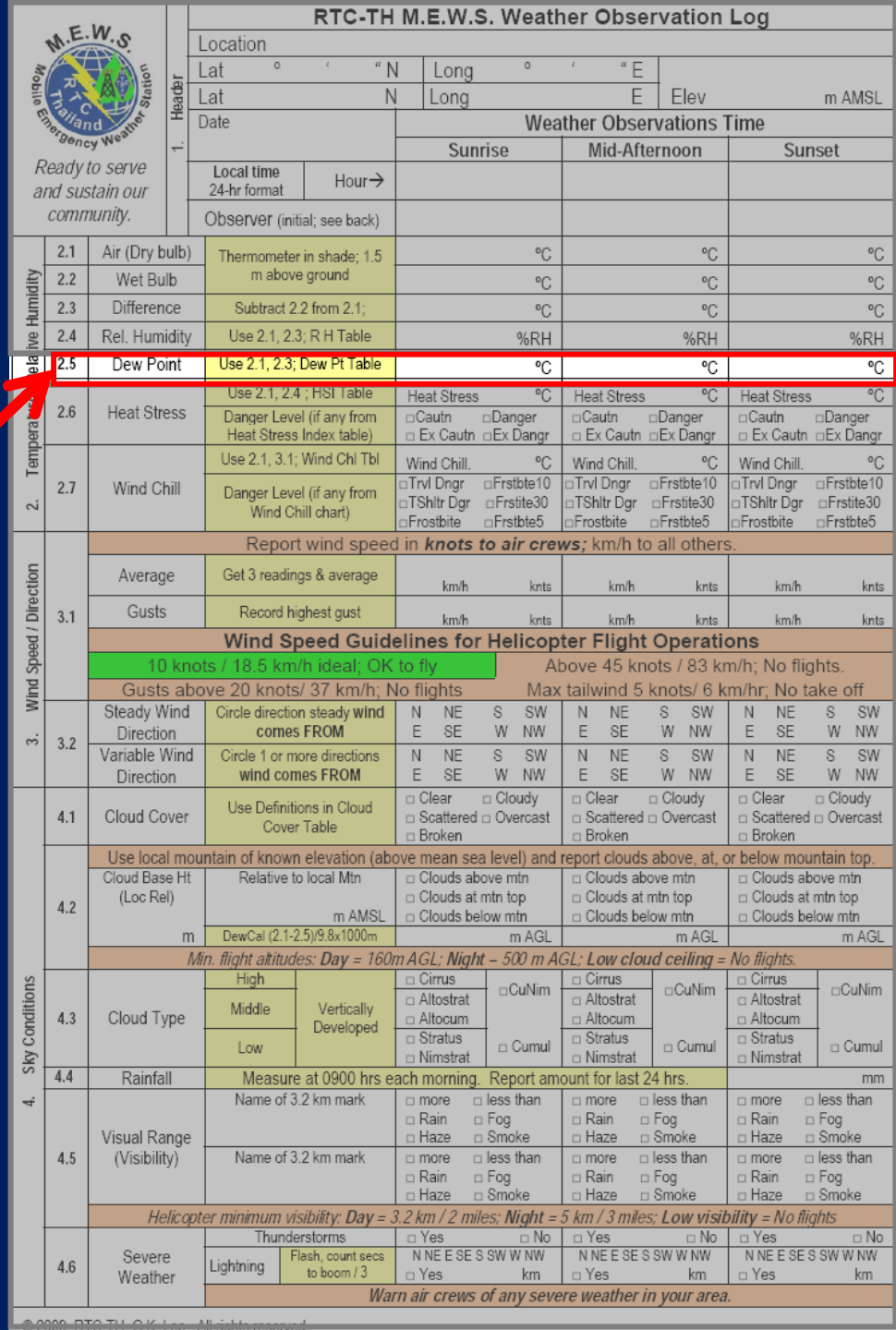
DEW POINT TEMPERATURE CHART (°C)

Dry Bulb Temperature (Air Temperature °C)	Dry Bulb temperature minus Wet Bulb temperature in °C															
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
-20	-25	-33														
-17.5	-21	-27	-38													
-15	-19	-23	-28													
-12.5	-15	-18	-22	-29												
-10	-12	-14	-18	-21	-27	-36										
-7.5	-9	-11	-14	-17	-20	-26	-34									
-5	-7	-8	-10	-13	-16	-19	-24	-31								
-2.5	-4	-6	-7	-9	-11	-14	-17	-22	-28	-41						
0	-1	-3	-4	-6	-8	-10	-12	-15	-19	-24						
2.5	1	0	-1	-3	-4	-6	-8	-10	-13	-16						
5	4	3	2	0	-1	-3	-4	-6	-8	-10	-48					
7.5	6	6	4	3	2	1	-1	-2	-4	-6	-22					
10	9	8	7	6	5	4	2	1	0	-2	-13					
12.5	12	11	10	9	8	7	6	4	3	2	-7	-28				
15	14	13	12	12	11	10	9	8	7	5	-2	-14				
17.5	17	16	15	14	13	12	12	11	10	8	2	-7	-35			
20	19	18	18	17	16	15	14	14	13	12	6	-1	-15			
22.5	22	21	20	20	19	18	17	16	16	5	10	3	-6	-38		
25	24	24	23	22	21	21	20	19	18	18	3	7	0	-14		
27.5	27	26	25	25	24	23	23	22	21	20	16	11	5	-5	-32	
30	29	29	28	27	27	26	25	25	24	23	19	14	9	2	-11	
32.5	32	31	31	30	29	29	28	27	26	26	22	18	13	7	-2	
35	34	34	33	32	32	31	31	30	29	28	25	21	16	11	4	
37.5	37	36	36	35	34	34	33	32	32	31	28	24	20	15	9	0
40	39	39	38	38	37	36	36	35	34	34	30	27	23	18	13	6
42.5	42	41	41	40	40	39	38	38	37	36	33	30	26	22	17	11
45	44	44	43	43	42	42	41	40	40	39	36	33	29	25	21	15
47.5	47	46	45	45	45	44	44	43	42	42	39	35	32	28	24	19
50	49	49	48	48	47	47	46	45	45	44	41	38	35	31	28	23

- Use the hygrometer to get the Dry Bulb and the Wet Bulb Temperature. Example, Dry Bulb = 30°C, Wet Bulb = 28°C.
- Subtract the Wet Bulb temperature from the Dry Bulb temperature. Example, 30°C – 28°C = 2°C.
- Find the column for 2°C across the top of the chart. Locate 30°C in the Air Temperature column at the left side of the chart. Find the intersection of the column and row to get the Dew Point Temperature. For the example of 2°C and 30°C, the Dew Point Temperature is 27°C.
- Divide 27°C by 10°C = 2.7 X 1000 m = 2700 m (the altitude of the bottom of the clouds)

Record the Dew Point Temperature

Step 7: Write the Dew Point Temperature in Section 2.5



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header	Location					
	Lat ° ' " N		Long ° ' " E			
	Lat N		Long E		Elev m AMSL	
	Date		Weather Observations Time			
			Sunrise		Mid-Afternoon	Sunset
	Local time 24-hr format	Hour→				
	Observer (initial; see back)					
2. Temperature & Relative Humidity	2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2	Wet Bulb		°C	°C	°C
	2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
			Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
	2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
			Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5
3. Wind Speed / Direction			Report wind speed in ***knots to air crews;*** km/h to all others.			
	3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
		Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
			Wind Speed Guidelines for Helicopter Flight Operations			
			10 knots / 18.5 km/h ideal; OK to fly		Above 45 knots / 83 km/h; No flights.	
			Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off	
	3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
		Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
	4.2		Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
		Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		m	m AMSL / DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
			*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*			
	4.3	Cloud Type	High / Middle / Low — Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat — □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat — □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat — □CuNim □ Cumul
	4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
			*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*			
	4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
			Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
			Warn air crews of any severe weather in your area.			

Calculating Cloud Base Height using the Dew Point Temperature

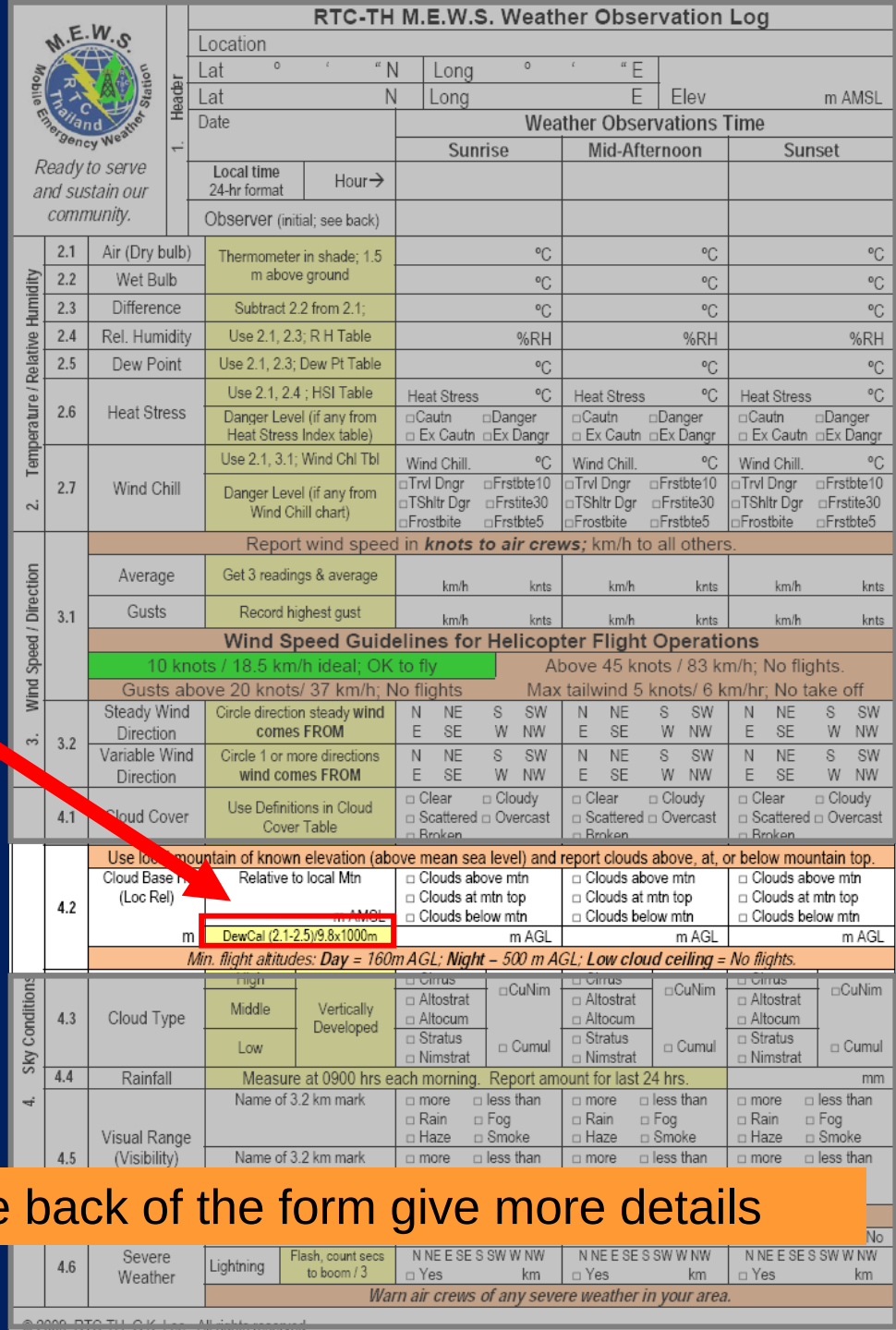
NOTE:

Once you have the Dew Point temperature, you can use the dry lapse rate to calculate the height of the cloud base above the ground level.

The Cloud Base Height is recorded in Section 4.2.

Guide notes are on the front of the form

DewCal (2.1-2.5)/9.8 x 1000m



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header

Location

Lat ° ' " N Long ° ' " E

Lat N Long E Elev m AMSL

Date

Weather Observations Time

	Sunrise	Mid-Afternoon	Sunset
Local time 24-hr format Hour→			
Observer (initial; see back)			

2. Temperature / Relative Humidity

			Sunrise	Mid-Afternoon	Sunset
2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

3. Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

			Sunrise	Mid-Afternoon	Sunset
3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly

Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights

Max tailwind 5 knots/ 6 km/hr; No take off

			Sunrise	Mid-Afternoon	Sunset
3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

			Sunrise	Mid-Afternoon	Sunset
4.2	Cloud Base Height (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	m AMSL DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*

4. Sky Conditions

				Sunrise	Mid-Afternoon	Sunset
4.3	Cloud Type	High	Vertically Developed	□ Cirus □ Altostrat □ Altocum □ Stratus □ Nimstrat	□ Cirus □ Altostrat □ Altocum □ Stratus □ Nimstrat	□ Cirus □ Altostrat □ Altocum □ Stratus □ Nimstrat
		Middle	□CuNim			
		Low	□ Cumul			
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.				mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark		□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark		□ more □ less than	□ more □ less than	□ more □ less than
4.6	Severe Weather	Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km

Warn air crews of any severe weather in your area.

Brief notes on the back of the form give more details

Additional brief guide notes are on the back of the form

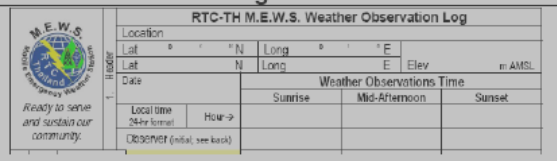
Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook. (See Section 4.2.2, pp. 23-24

All weather observers write their initials and clearly print their name using block letters

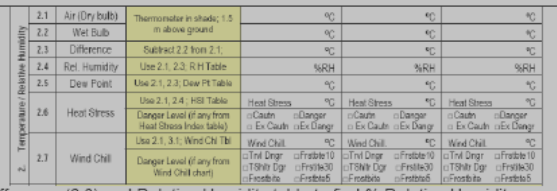
M.E.W.S. Summary Weather Observation Log Instructions

Header

Location: Local Place Name
Latitude, Longitude from GPS, survey records or map measurement.
Elevation: Survey records or map measurement (GPS elevations are not reliable).
Date/Hour: Use local Thai standard time in 24-hour format.
Observer: initials in box. Full name (print clearly) on top/back of form

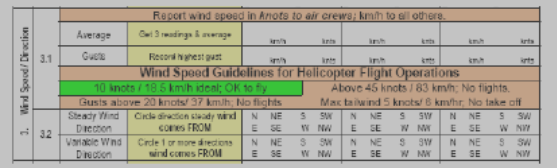


Temperature / Relative Humidity



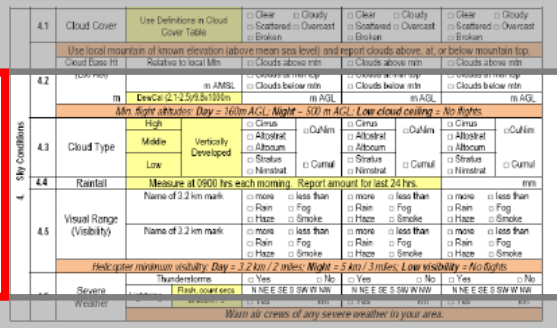
2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.
2.2 Wet Bulb Temp from hyrgrometer kept in the shade, 1.5 m above the ground.
2.3 Difference between Dry and Wet Bulb temperatures.
2.4 Relative Humidity: Use Dry Bulb Temp (2.1), Difference (2.3) and Relative Humidity table to find % Relative Humidity.
2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.
2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.
2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Wind Speed / Direction



3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. *Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.*
3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions.

Sky Conditions

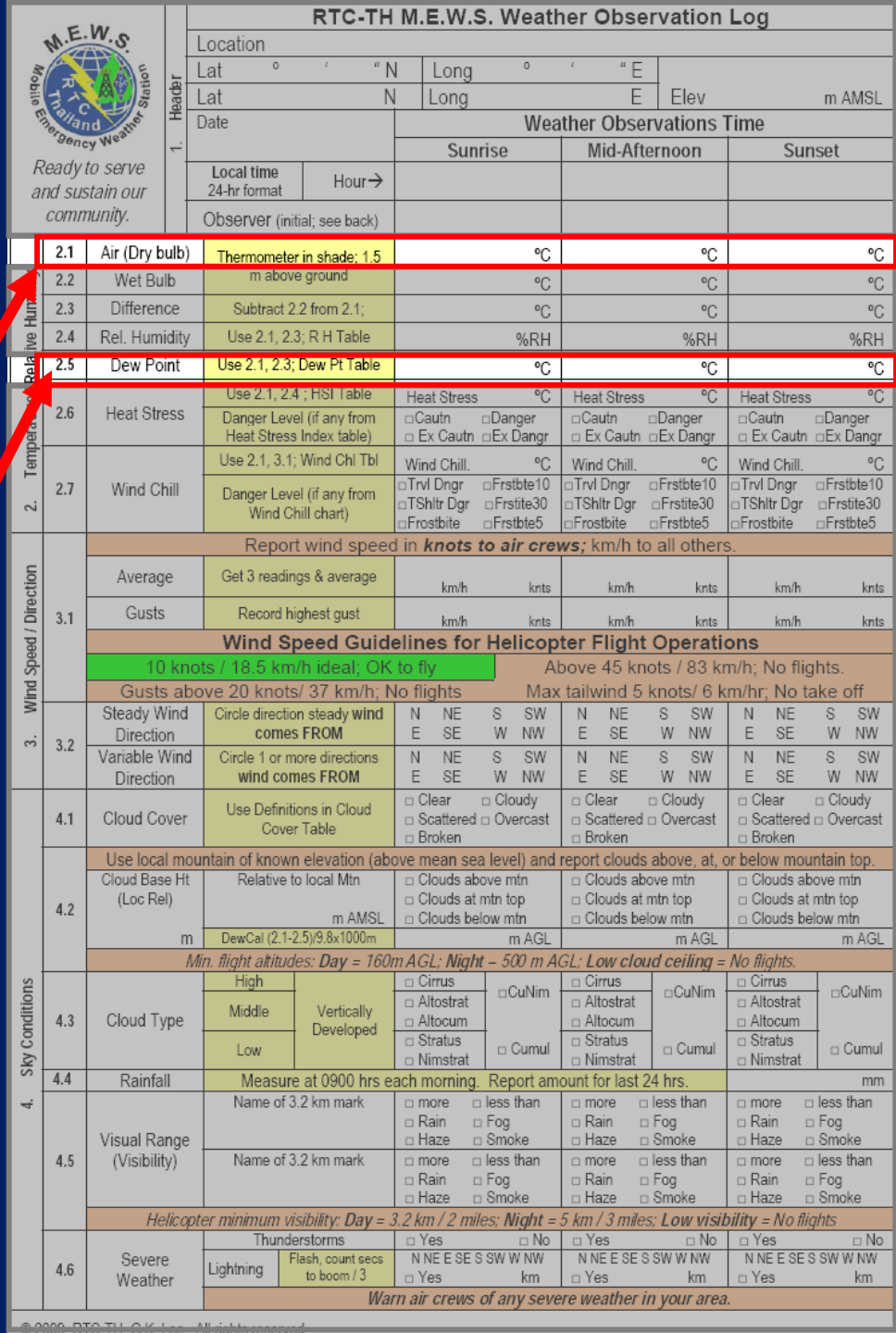


4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.
4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 9.8; multiply quotient by 1000m. *Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.*
4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book
4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects, with top of gauge 50 cm above ground to avoid splash water from entering gauge.
4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less than the known distances to these landmarks. *Advise air crews when visual range is close to affecting helicopter flight operations.* Check appropriate boxes for reasons of reduced visibility.
4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, divide by 3 = approximate distance in km. Circle direction to storm.

Using the Dew Point Temperature

Step 8. Find the difference between the air temperature and the Dew Point temperature.

Air Temp
-Dew Pt Temp
= (Difference)



RTC-TH M.E.W.S. Weather Observation Log

Location
Lat ° ' "N Long ° ' "E
Lat N Long E Elev m AMSL
Date

Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

Local time 24-hr format / Hour→
Observer (initial; see back)

1. Header

2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C

2. Temperature / Relative Humidity

2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □Ex Cautn □Ex Dangr	□Cautn □Danger □Ex Cautn □Ex Dangr	□Cautn □Danger □Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

3. Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.
Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/hr; No take off

3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW

4. Sky Conditions

4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	m AMSL / DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*

4.3	Cloud Type	High / Middle / Low — Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke

*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*

4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning / Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km

Warn air crews of any severe weather in your area.

Calculating Cloud Base Height using the Dew Point Temperature

Step 9. Divide the temperature difference by 9.8°C (the dry lapse rate).

For example:
Air temperature = 30°C
Dew Pt Temp = 27°C
Temp Difference = 3°C

3°C divided by 9.8 = 0.306122

The dry lapse rate is the temperature decrease of air rising from the surface of the earth into the atmosphere per 1000 m of altitude.

Calculating Cloud Base Height using the Dew Point Temperature

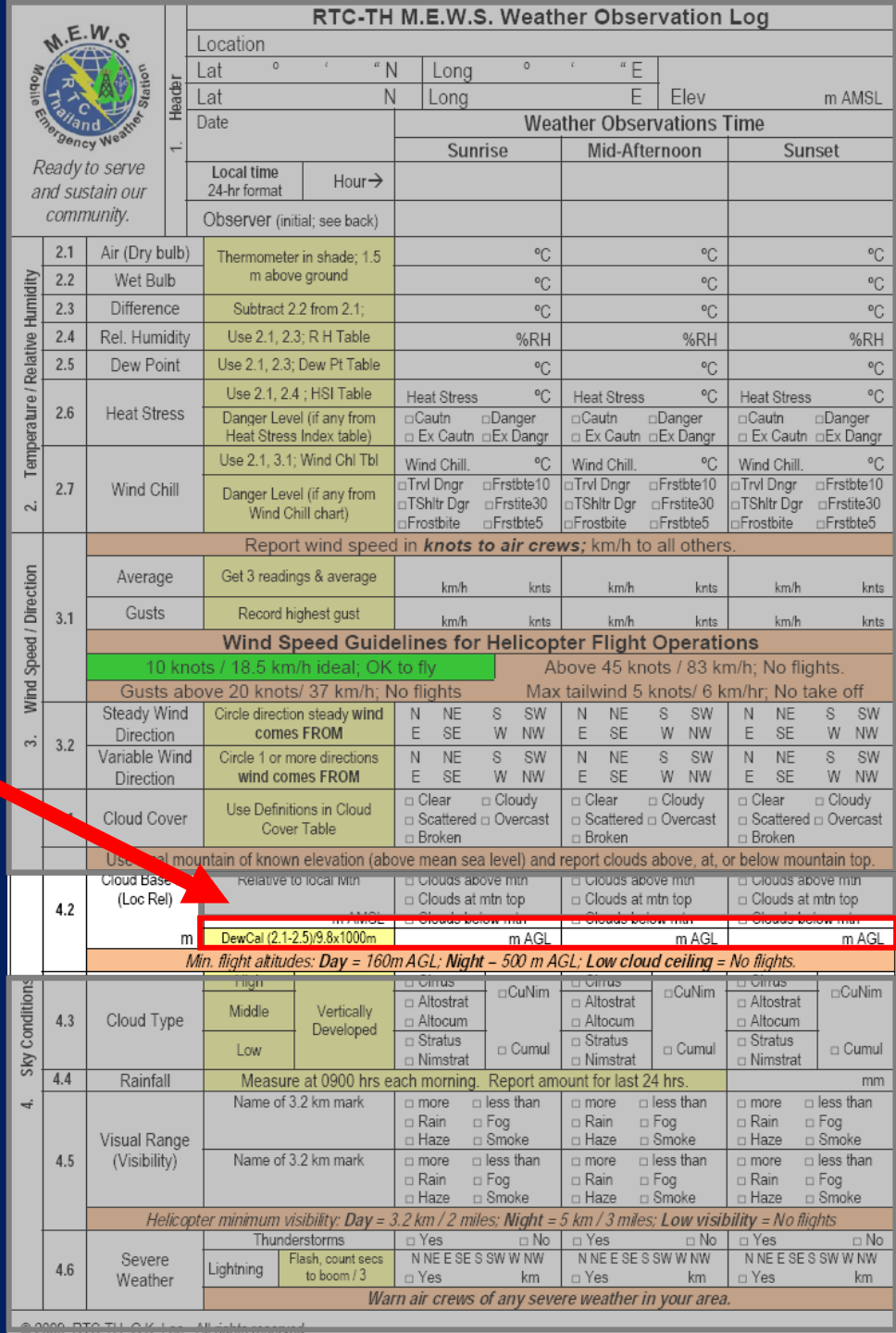
Step 10. Multiply the result from Step 9 by 1000 m to get the estimated height of the cloud base above the ground.

For example:
3°C divided by 9.8 = 0.306122
0.306122 X 1000 = 306.1224 m

You may round the result to the nearest whole meter when recording this on the log form and reporting to flight crews.

Record the calculated cloud base height from the Dew Pont method in the space provided in the lower part of Section 4.2

Report the cloud base height to flight crews as “calculated by dew point method” so they know the origin of the information.



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header

Location
Lat ° ‘ “N Long ° ‘ “E
Lat N Long E Elev m AMSL
Date
Local time 24-hr format Hour→
Observer (initial; see back)

Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

2. Temperature / Relative Humidity

			Sunrise	Mid-Afternoon	Sunset
2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

3. Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

			Sunrise	Mid-Afternoon	Sunset
3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly
Above 45 knots / 83 km/h; No flights.
Gusts above 20 knots/ 37 km/h; No flights
Max tailwind 5 knots/ 6 km/h; No take off

			Sunrise	Mid-Afternoon	Sunset
3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW

4. Sky Conditions

			Sunrise	Mid-Afternoon	Sunset
	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

			Sunrise	Mid-Afternoon	Sunset
4.2	Cloud Base (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top	□ Clouds above mtn □ Clouds at mtn top	□ Clouds above mtn □ Clouds at mtn top
	m	DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

Min. flight altitudes: ***Day*** *= 160m AGL;* ***Night*** *– 500 m AGL;* ***Low cloud ceiling*** *= No flights.*

				Sunrise	Mid-Afternoon	Sunset
4.3	Cloud Type	High	Vertically Developed	□Cirus □Altostrat □Altocum □Stratus □Nimstrat	□Cirus □Altostrat □Altocum □Stratus □Nimstrat	□Cirus □Altostrat □Altocum □Stratus □Nimstrat
		Middle	□CuNim			
		Low	□ Cumul			
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.				mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark		□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark		□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke

Helicopter minimum visibility: ***Day*** *= 3.2 km / 2 miles;* ***Night*** *= 5 km / 3 miles;* ***Low visibility*** *= No flights*

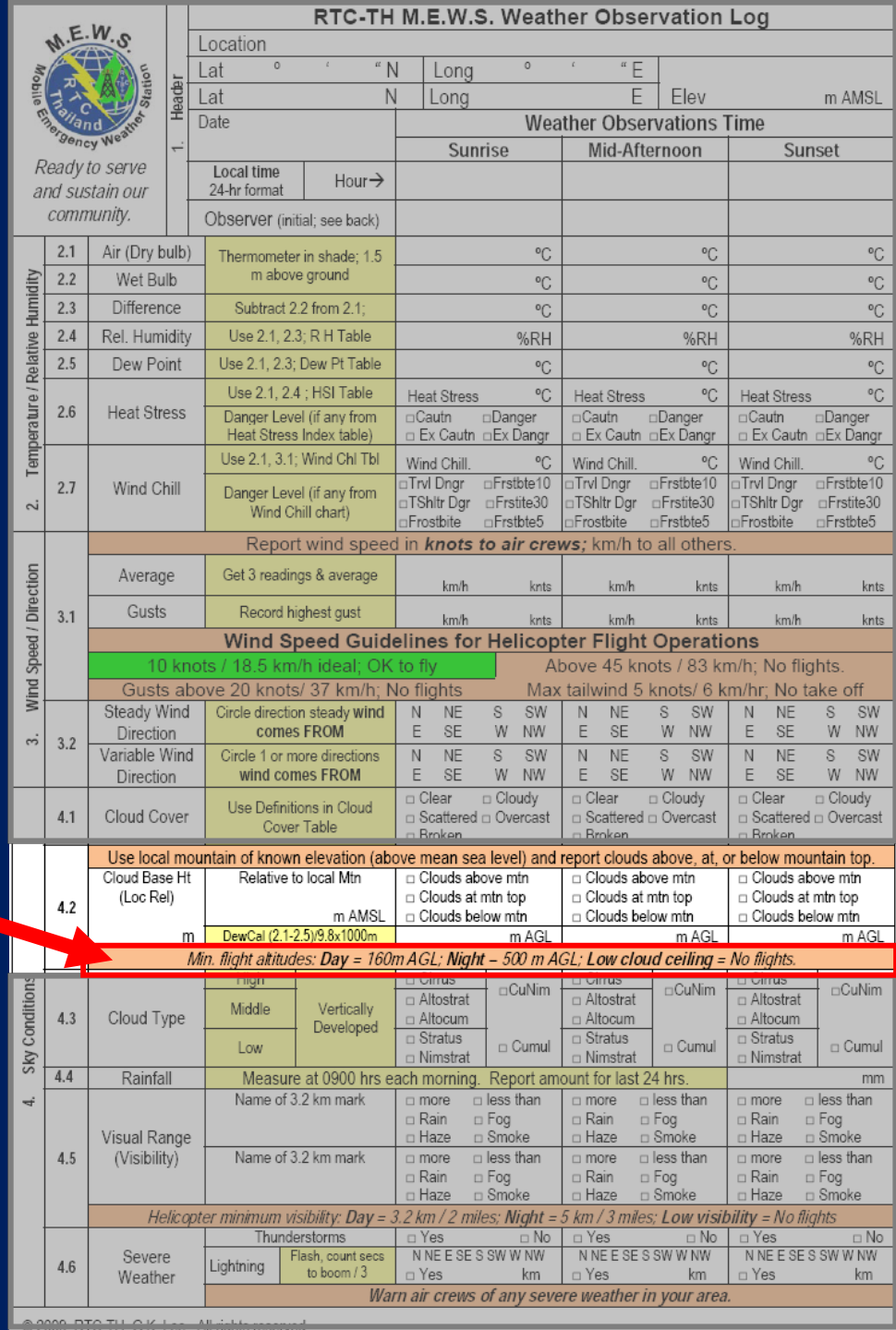
				Sunrise	Mid-Afternoon	Sunset
4.6	Severe Weather	Thunderstorms		□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning	Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km

Warn air crews of any severe weather in your area.

Brief notes on the form remind you of cloud base heights affecting helicopter flight operations

Min. flight altitudes:
Day = 160m AGL;
Night = 500 m AGL;
Low cloud ceiling =
No flights

Advise flight crews when conditions are approaching minimum operating limits.



RTC-TH M.E.W.S. Weather Observation Log

Ready to serve and sustain our community.

1. Header
Location
Lat ° ' "N Long ° ' "E
Lat N Long E Elev m AMSL
Date
Weather Observations Time: Sunrise | Mid-Afternoon | Sunset
Local time 24-hr format Hour→
Observer (initial; see back)

2. Temperature / Relative Humidity

			Sunrise	Mid-Afternoon	Sunset
2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	□Cautn □Danger □Ex Cautn □Ex Dangr	□Cautn □Danger □Ex Cautn □Ex Dangr	□Cautn □Danger □Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

3. Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

			Sunrise	Mid-Afternoon	Sunset
3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.
Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/h; No take off

			Sunrise	Mid-Afternoon	Sunset
3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW

4. Sky Conditions

			Sunrise	Mid-Afternoon	Sunset
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
4.2	Cloud Base Ht (Loc Rel) m	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.			
		Relative to local Mtn m AMSL	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
		DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL
		*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*			
4.3	Cloud Type	High	□ Cirus	□ Cirus	□ Cirus
		Middle	□ Altostrat □ Altocum	□ Altostrat □ Altocum	□ Altostrat □ Altocum
		Low	□ Stratus □ Nimstrat	□ Stratus □ Nimstrat	□ Stratus □ Nimstrat
		Vertically Developed	□CuNim □ Cumul	□CuNim □ Cumul	□CuNim □ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*			
4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km
		Warn air crews of any severe weather in your area.			

For flight operations, be aware of mountain elevations in your area. Advise flight crews as needed.

For the example we completed, the Cloud Base Height was 306 m. Doi Phu Kha (elevation 1980 m AMSL) is close to station HSØZHM. It would be appropriate for HSØZHM to report “Cloud Base Height 306 m calculated by Dew Point. Be advised, this is well below peak elevation of Doi Phu Kha 1700 m AGL.”

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

Important Note

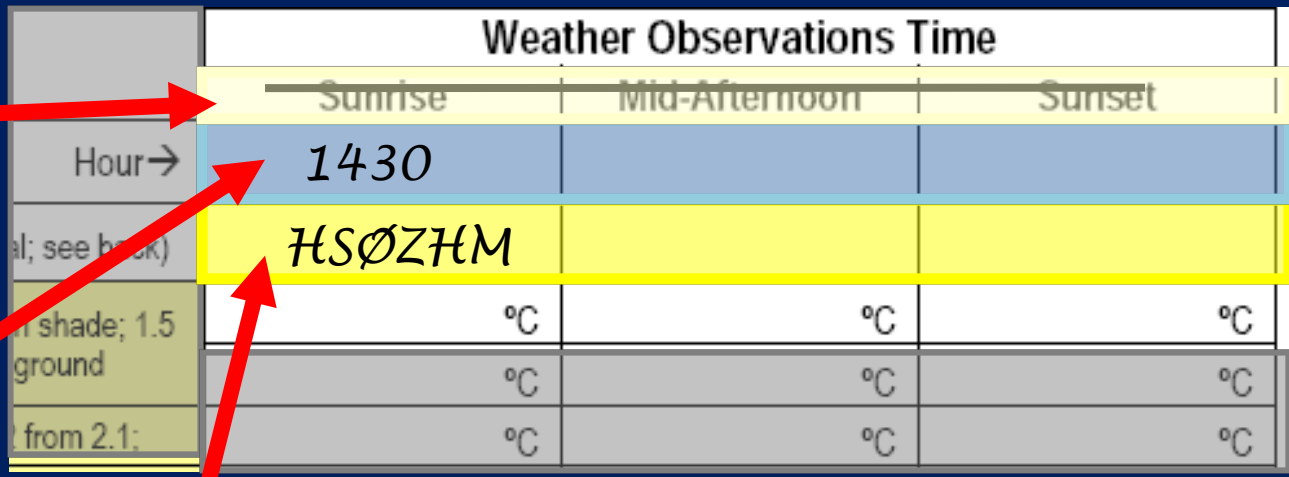
Normally MEWS observations are made 3 times a day. However, if flight operations are in progress, try to provide flight crews with weather updated prior to landings and take-offs for flight safety.

Report a Flight Advisory any time cloud base height is ***near to, at, or less*** than the warning limits listed on the Log Form.

For flight operations, make and report observations to flight crews before landings and take-offs

Cross out the headings for Sunrise, Mid-Afternoon, Sunset

Record the specific local time of your observations



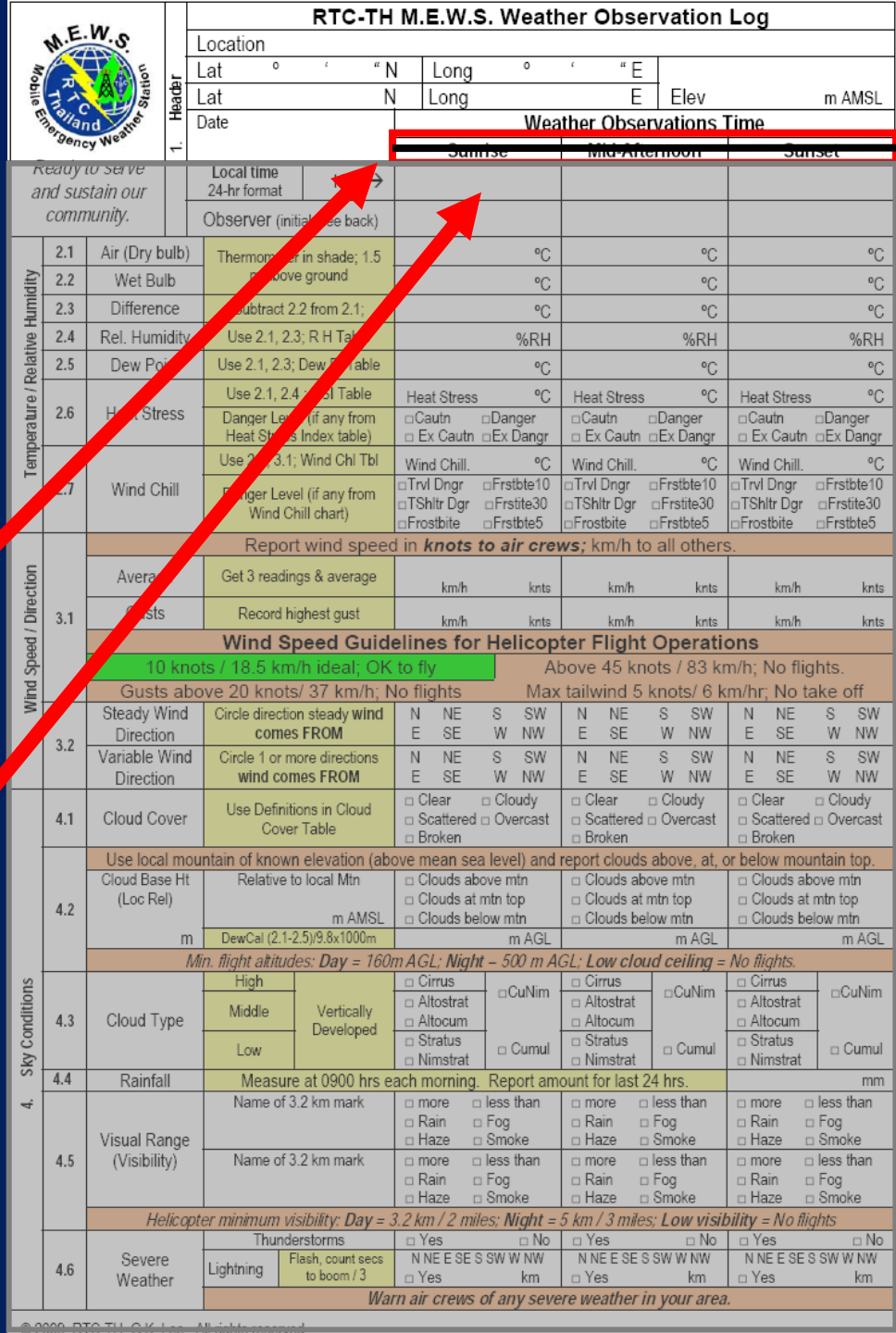
If a HAM, print your call sign (or name if no call sign)

Record the Cloud Base Height in Section 4.2

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

If more frequent observations are done to support flight operations...

…cross out the headings “Sunrise”, etc. and record the time of the observations in the space provided.



RTC-TH M.E.W.S. Weather Observation Log

Location

Lat ° ‘ “N Long ° ‘ “E

Lat N Long E Elev m AMSL

Date

Weather Observations Time

Sunrise | Mid-Afternoon | Sunset

Ready to serve and sustain our community.

Local time 24-hr format

Observer (initial ee back)

1. Header

Temperature / Relative Humidity

			Sunrise	Mid-Afternoon	Sunset
2.1	Air (Dry bulb)	Thermom er in shade; 1.5 above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	ubtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Tal	%RH	%RH	%RH
2.5	Dew Poi	Use 2.1, 2.3; Dew T able	°C	°C	°C
2.6	H t Stress	Use 2.1, 2.4 l Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Le if any from Heat St s Index table)	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr	□Cautn □Danger □ Ex Cautn □Ex Dangr
2.7	Wind Chill	Use 2 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		nger Level (if any from Wind Chill chart)	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5	□Trvl Dngr □Frstbte10 □TShltr Dgr □Frstite30 □Frostbite □Frstbte5

Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

			Sunrise	Mid-Afternoon	Sunset
3.1	Avera	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	sts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/h; No take off

			Sunrise	Mid-Afternoon	Sunset
3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW

Sky Conditions

			Sunrise	Mid-Afternoon	Sunset
4.1	Cloud Cover	Use Definitions in Cloud Cover Table	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken	□ Clear □ Cloudy □ Scattered □ Overcast □ Broken
4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn	□ Clouds above mtn □ Clouds at mtn top □ Clouds below mtn
	m	m AMSL / DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

*Min. flight altitudes: **Day** = 160m AGL; **Night** – 500 m AGL; **Low cloud ceiling** = No flights.*

			Sunrise	Mid-Afternoon	Sunset
4.3	Cloud Type	High / Middle / Low — Vertically Developed	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul	□ Cirrus □ Altostrat □ Altocum □ Stratus □ Nimstrat □CuNim □ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke
		Name of 3.2 km mark	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke	□ more □ less than □ Rain □ Fog □ Haze □ Smoke

*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*

			Sunrise	Mid-Afternoon	Sunset
4.6	Severe Weather	Thunderstorms	□ Yes □ No	□ Yes □ No	□ Yes □ No
		Lightning / Flash, count secs to boom / 3	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km	N NE E SE S SW W NW □ Yes km

Warn air crews of any severe weather in your area.

For flight operations, make and report observations to flight crews before landings and take-offs

Advanced Weather Reports for Flight Crews

- 2.1 Temperature
- 2.4 Relative Humidity
- 3.1 Wind Speed
- 3.2 Wind Direction
- 4.1 Cloud Cover
- 4.2 Cloud Base Height
- 4.3 Cloud Type
- 4.4 Rainfall
- 4.5 Visual Range
- 4.6 Severe Weather

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

Another Use of Dew Point Temperature

Often early morning temperature = the Dew point temperature. This means dew forms and can be collected for survival drinking water.

Photos from the Internet; educational fair use clause

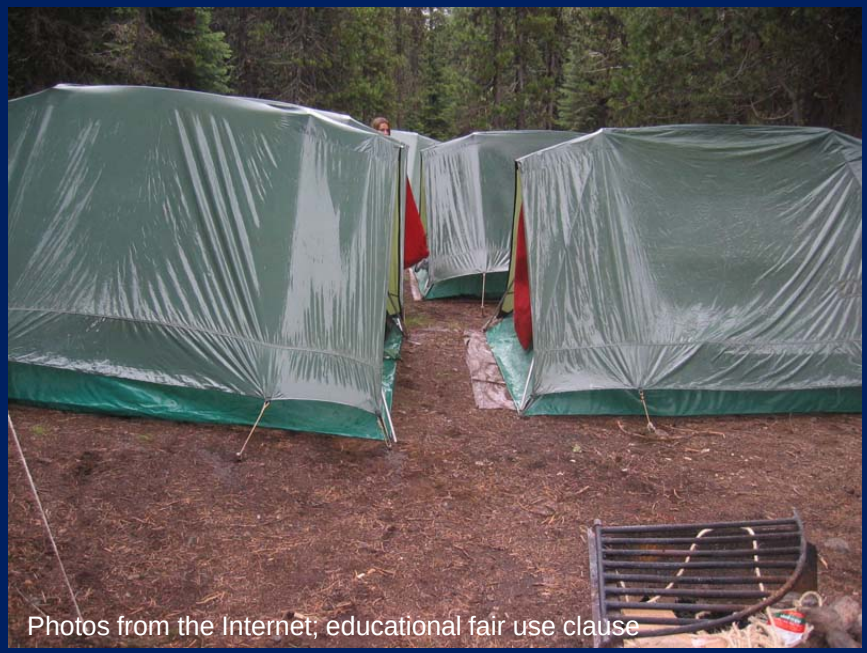
The water may need to be treated before drinking; See lesson EP-3.

Plan ahead to have fog catching materials as part of your emergency preparedness kit.

Another Use of Dew Point Temperature

If dew forms. tents and, people sleeping outdoors, and uncovered supplies/equipment will get wet.

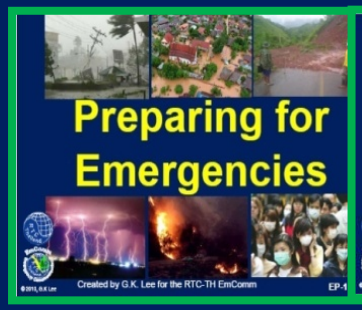
This means they may feel colder in the morning.



Photos from the Internet; educational fair use clause

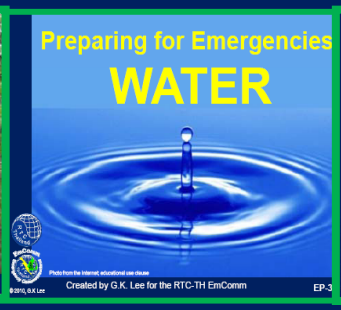
If dew in expected, warn people and make preparations to keep thngs dry.

The EP Lesson Series



EP-1

EP-2



EP-3

EP-4

EP-5

EP-6

EP-7

EP-8

EP-9

EP-10

EP-11

EP-12

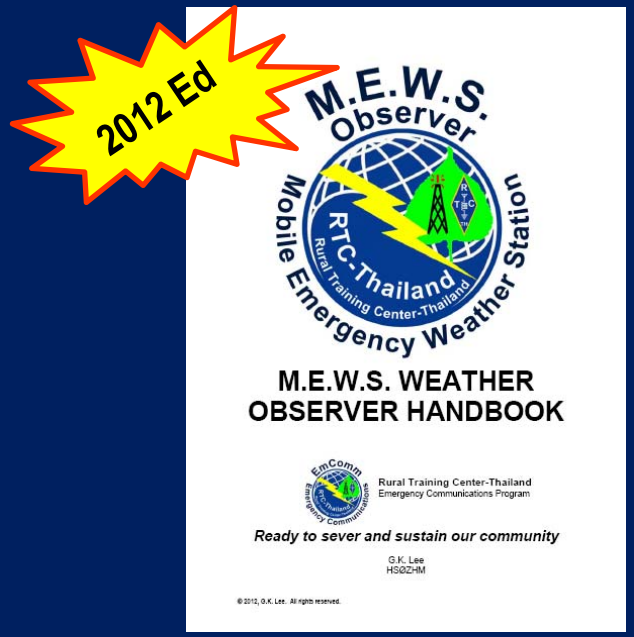
www.neighborhoodlink.com/RTC-TH_Tech/pages

You have completed the Advanced MEWS Lesson A3: Using Dew Point Temperature to Calculate Cloud Base Height

You are now ready for Advanced MEWS Lesson A4: Measuring Rainfall

Questions or Comments

Refer to the MEWS Weather Observer Handbook for more details on any of the procedures in this lesson.

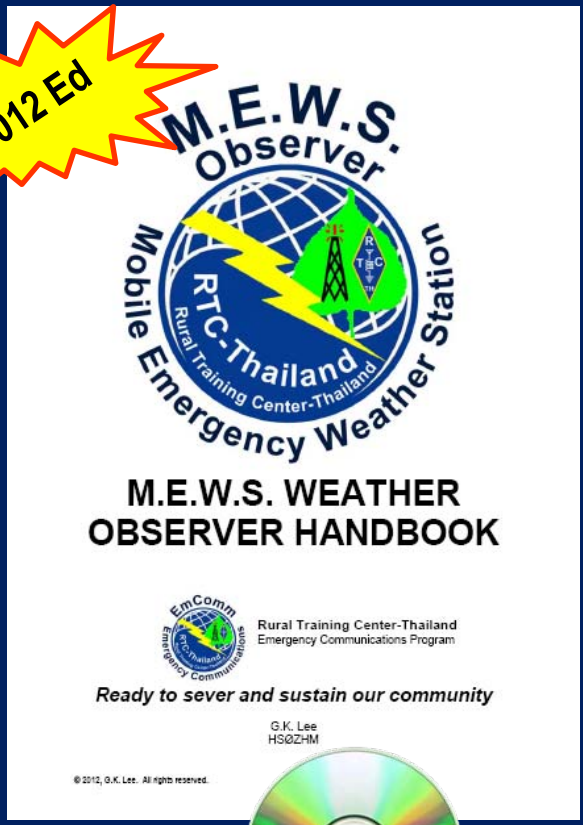


You may also contact us by e-mail:
hsØzhm@gmail.com
We are always trying to improve our lessons. Your comments and suggestions are welcomed.

Free Self-Study Materials by Internet

- RTC-TH Weather Observer manual
- Illustrated PDF topical lessons

2012 Ed



All of the lessons have been classroom and field proven.

Send e-mail to hsØzhm@gmail.com to request free training materials for non-commercial use only.

These materials are in English. Volunteer assistance for Thai translation to is welcome and will be acknowledged and cited.

Advanced MEWS PDF Lessons

A 1: Measuring Relative Humidity and Heat Stress

A 2: Measuring Wind Speed and Wind Chill

A 3: Using Dew Point Temperature to Calculate Cloud Base Height

A 4: Measuring Rainfall

A 5: Reporting Severe Weather

A 6: Weather Forecasting

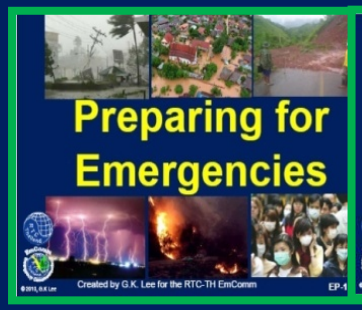
Be sure to check www.neighborhoodlink.com/RTC-TH_Tech/pages for the latest updated editions of MEWS lessons

Advanced MEWS PDF Lessons

2012 Ed

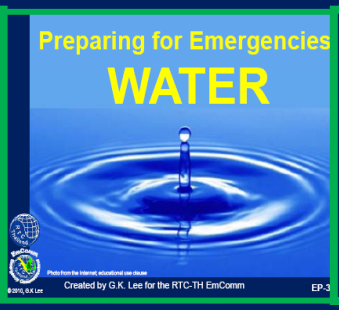
Six slide show lessons;
Some show how to build your own weather equipment

The EP Lesson Series



EP-1

EP-2



EP-3

EP-4

EP-5

EP-6

EP-7

EP-8

EP-9

EP-10

EP-11

EP-12

www.neighborhoodlink.com/RTC-TH_Tech/pages

For More Information about M.E.W.S.

Contact
Greg, HSØZHM
MEWS Creator / Mentor

Via E-mail
hsØzhm@gmail.com

Via Skype video
conference call: rtc_th

Community-based Environmental Education for

The End

www.neighborhoodlink.com/org/rtcth

E-mail: rtc2k5@gmail.com