



DETERMINING THE DEW POINT WITH A SLING PSYCHROMETER

GENERAL

This test method describes how to determine the dew point using a sling psychrometer. A psychrometer measures the ambient air temperature (dry bulb temperature) and the wet bulb temperature. From the dry bulb and wet bulb temperature the dew point is calculated. The dew point is the temperature at which moisture in the air will start condensing.

When painting structural steel, specifications may require the dew point to be measured. This is to ensure that no moisture is condensed on the surface to be painted.

APPARATUS

1. Sling psychrometer
2. Replacement thermometer
3. Replacement wicks

INSTRUMENT OPERATION

1. Before using, take the end cap off the psychrometer and fill the reservoir with water. Be sure the wick is saturated with water and covers the mercury reservoir on the wet bulb thermometer. Be sure the mercury reservoir on the dry bulb thermometer is dry.
2. Pull the tube clear of the body so the body can swivel.
3. Holding the tube, whirl the body two to three revolutions per second.
4. Continue whirling until temperatures stabilize (1 1/2 minutes is usually ample).
5. Immediately read the wet bulb thermometer and then the dry bulb thermometer.
6. Figure the difference between the dry bulb and wet bulb temperature. On Table 1, locate the column, which is headed with this temperature difference. Then locate the row labeled with the appropriate dry bulb temperature. The value at the intersection of the column and row gives the dew point.
7. The dew point should be at least 5°F less than the surface temperature of the steel being painted.

EXAMPLE

If the dry bulb temperature is 71°F and the wet bulb temperature is 64°F, the difference between the dry bulb and wet bulb is 7°F. At the top of Table 1, locate the column headed with 7. Follow this column down to the row headed with the dry bulb temperature of 71°F. The intersection of the column and row gives the number 60, which is the dew point in degrees Fahrenheit. Add 5 degrees to the dew point to get 65°F. Sixty-five is the minimum surface temperature of the steel before painting should begin to ensure that there is no condensation on the surface.

NOTES

1. The surface and air temperature will vary depending on the location of the temperature measurements. For instance, a beam exposed to direct sunlight will be much warmer than a beam in the shade. Therefore if painting work is done in the shade, temperature measurements should also be done in the shade.
2. Moisture problems are most likely to be encountered in the morning, so temperature measurements should be made in the morning before painting begins.

REPORTING RESULTS

The following information should be reported: Time, dry bulb temperature, wet bulb temperature, dew point, and surface temperature.

**Table 1 - Dew Point Temperature - °F
 Difference Between Dry Bulb and Wet Bulb - °F**

Dry Bulb °F	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20
40	40	38	35	33	--	--	--	--	--	--	--	--	--	--	--	--
41	41	39	36	34	--	--	--	--	--	--	--	--	--	--	--	--
42	42	40	38	35	33	--	--	--	--	--	--	--	--	--	--	--
43	43	41	39	36	34	--	--	--	--	--	--	--	--	--	--	--
44	44	42	40	37	35	--	--	--	--	--	--	--	--	--	--	--
45	45	43	41	38	36	34	--	--	--	--	--	--	--	--	--	--
46	46	44	42	40	37	35	--	--	--	--	--	--	--	--	--	--
47	47	45	43	41	38	36	33	--	--	--	--	--	--	--	--	--
48	48	46	44	42	40	38	35	--	--	--	--	--	--	--	--	--
49	49	47	45	43	41	38	36	33	--	--	--	--	--	--	--	--
50	50	48	46	44	42	40	37	34	--	--	--	--	--	--	--	--
51	51	49	47	45	43	41	38	36	33	--	--	--	--	--	--	--
52	52	50	48	46	44	42	40	37	34	--	--	--	--	--	--	--
53	53	51	49	47	45	43	41	38	36	33	--	--	--	--	--	--
54	54	52	50	48	46	44	42	40	37	34	--	--	--	--	--	--
55	55	53	51	50	48	45	43	41	38	36	33	--	--	--	--	--
56	56	54	53	51	49	47	44	42	40	37	34	--	--	--	--	--
57	57	55	54	52	50	48	46	43	41	39	36	--	--	--	--	--
58	58	56	55	53	51	49	47	45	42	40	37	--	--	--	--	--
59	59	57	56	54	52	50	48	46	44	41	39	33	--	--	--	--
60	60	58	57	55	53	51	49	47	45	43	40	35	--	--	--	--
61	61	59	58	56	54	52	50	48	46	44	42	36	--	--	--	--
62	62	60	59	57	55	53	52	50	47	45	43	38	--	--	--	--
63	63	61	60	58	56	55	53	51	49	47	44	39	34	--	--	--
64	64	62	61	59	57	56	54	52	51	48	46	41	35	--	--	--
65	65	63	62	60	59	57	55	53	51	49	47	42	37	--	--	--
66	66	64	63	61	60	58	56	54	52	50	48	44	38	--	--	--
67	67	65	64	62	61	59	57	55	53	52	49	45	40	34	--	--
68	68	67	65	63	62	60	58	57	55	53	51	46	42	36	--	--
69	69	68	66	64	63	61	59	58	56	54	52	48	43	37	--	--
70	70	69	67	65	64	62	61	59	57	55	53	49	44	39	33	--
71	71	70	68	67	65	63	62	60	58	56	54	50	46	41	35	--
72	72	71	69	68	66	64	63	61	59	58	56	52	47	42	37	--
73	73	72	70	69	67	66	64	62	60	59	57	53	49	44	38	--
74	74	73	71	70	68	67	65	63	62	60	58	54	50	45	40	34
75	75	74	72	71	69	68	66	64	63	61	59	55	51	47	42	36
76	76	75	73	72	70	69	67	66	64	62	60	56	53	48	43	38
77	77	76	74	73	71	70	68	67	65	63	62	57	54	50	45	39
78	78	77	75	74	72	71	69	68	66	64	63	58	55	51	46	41

**Table 1 - Dew Point Temperature - °F (cont.)
 Difference Between Dry Bulb and Wet Bulb - °F**

Dry Bulb °F	0	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20
79	79	78	76	75	73	72	70	69	67	66	64	59	57	53	48	43
80	80	79	77	76	74	73	72	70	68	67	65	61	58	54	50	44
81	81	80	78	77	75	74	73	71	70	68	66	63	59	55	51	49
82	82	81	79	78	77	75	74	72	71	69	67	64	60	57	52	50
83	83	82	80	79	78	76	75	73	72	70	69	65	62	58	54	52
84	84	83	81	80	79	77	76	74	73	71	70	66	63	59	55	53
85	85	84	82	81	80	78	77	75	74	72	71	68	64	61	57	54
86	86	85	83	82	81	79	78	76	75	73	72	69	65	62	58	56
87	87	86	84	83	82	80	79	78	76	75	73	70	67	63	59	57
88	88	87	85	84	83	81	80	79	77	76	74	71	68	64	61	59
89	89	88	86	85	84	82	81	80	78	77	75	72	69	66	62	60
90	90	89	87	86	85	83	82	81	79	78	76	73	70	67	63	61
91	91	90	88	87	86	85	83	82	80	79	78	75	71	68	65	63
92	92	91	89	88	87	86	84	83	81	80	79	76	73	69	66	64
93	93	92	90	89	88	87	85	84	83	81	80	77	74	71	67	65
94	94	93	92	90	89	88	86	85	84	82	81	78	75	72	68	67
95	95	94	93	91	90	89	87	86	85	83	82	79	76	73	70	68
96	96	95	94	92	91	90	88	87	86	84	83	80	77	74	71	69
97	97	96	95	93	92	91	89	88	87	85	84	81	78	75	72	70
98	98	97	96	94	93	92	90	89	88	87	85	82	79	76	73	72
99	99	98	97	95	94	93	92	90	89	88	86	83	81	78	74	73
100	100	99	98	96	95	94	93	91	90	89	87	85	82	79	76	74
101	101	100	99	97	96	95	94	92	91	90	88	86	83	80	77	75
102	102	101	100	98	97	96	95	93	92	91	89	87	84	81	78	76
103	103	102	101	99	98	97	96	94	93	92	91	88	85	82	79	78
104	104	103	102	100	99	98	97	95	94	93	92	89	86	83	80	79
105	105	104	103	101	100	99	98	96	95	94	93	90	87	84	82	80
106	106	105	104	102	101	100	99	98	96	95	94	91	88	86	83	81
107	107	106	105	103	102	101	100	99	97	96	95	92	90	87	84	82
108	108	107	106	104	103	102	101	100	98	97	96	93	91	88	85	84
109	109	108	107	105	104	103	102	101	99	98	97	94	92	89	86	85
110	110	109	108	106	105	104	103	102	100	99	98	95	93	90	87	86