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Determining Relative Humidity

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Relative humidity can be determined by making two temperature measurements—wet bulb and dry bulb. A single thermometer can be used to get the dry bulb or normal air temperature. It can also be used to get the wet bulb reading by slipping a wet shoe string over the bulb. See Figure 1. A sling psychrometer (see Figure 2) has two thermometers mounted so you can get both wet bulb and dry bulb readings simultaneously.

Figure 1

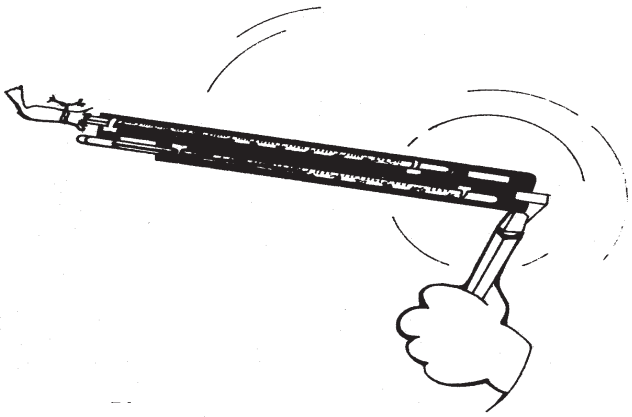

Figure 2

Relative Humidity from Tables

It is necessary to whirl or sling the wet bulb thermometer for about 1 minute for two or three times until there is no further drop in the wet bulb reading. Record the lowest reading as the wet bulb temperature (see Figure 3).

Under conditions A, (over), when both the wet bulb and dry bulb read 60°F, there is no difference or wet bulb depression, and the relative humidity is 100%; thus, the air is saturated with water vapor. Lower relative humidity levels will be reflected in lower wet bulb temperatures, (evaporation increases at lower relative humidities, cooling the wet bulb relative to the dry bulb.) The actual relative humidity can be determined from Table 1. For example, in condition B, when the wet bulb is 45°F and the dry bulb is 60°F, the wet bulb depression is 60–45 or 15. Using 15 and the air temperature (60°F), the relative humidity is 26% (from Table 1).

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The "ideal" indoor humidity level during the heating season involves a compromise between what is best for the building and its contents and what is best for the occupants. In general, these needs will be met when relative humidity is maintained in the range of about 35%–55%.

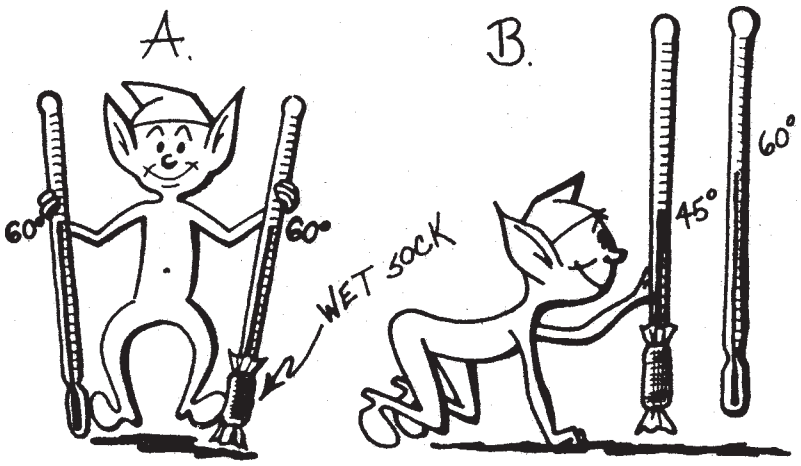

Figure 3 (A & B)

Table 1 Relative Humidity Values

Dry Bulb Air Temp.	Wet Bulb Depression (Wet Bulb – Dry Bulb)											
°F	1	2	3	4	5	6	7	8	9	10	15	20
35	91	81	72	63	54	45	36	27	19	10	0	0
40	92	83	75	68	60	52	45	37	29	22	0	0
45	93	86	78	71	64	57	51	44	38	31	0	0
50	93	87	80	74	67	61	55	49	43	38	10	0
55	94	88	82	76	70	65	59	54	49	43	19	0
60	94	89	83	78	73	68	63	58	53	48	26	5
65	95	90	85	80	75	70	66	61	56	52	31	12
70	95	90	86	81	77	72	68	64	59	55	36	19
75	96	91	86	82	78	74	70	66	62	58	40	24
80	96	91	87	83	79	75	72	68	64	61	44	29
90	96	92	89	85	81	78	74	71	68	65	49	36
100	96	93	89	86	83	80	77	73	70	68	54	41

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