TABLE 99. EFFECTIVE TEMPERATURE FOR VARIOUS WET BULB AND DRY BULB TEMPERATURES WITH AN AIR VELOCITY OF 700 FT. PER MINUTE

Persons Normally Clothed and Slightly Active

Wet Bulb Temperature

Effective Temperature

Dry Bulb Temp.	25	30	35	40	45	49	52	54	56	58	60	62	64	66	68	70	72	74	77	80	85	90	95	100
30																								
35																								
40																								
45																								
50			35.0	34.0	32.8	31.1																		
54				39.4	38.8	38.0	37.2	36.8																
57				43.0	42.7	42.2	42.0	41.8	41.4															
60				46.3	46.1	46.0	46.0	45.9	45.7	45.6	45.6													
62				48.3	48.3	48.3	48.2	48.2	48.2	48.2	48.2	48.2												
64					50.3	50.5	50.6	50.7	50.7	50.8	50.9	51.0	51.1											
66					52.3	52.6	52.8	52.9	53.0	53.0	53.2	53.4	53.6	53.9										
68					54.3	54.5	54.8	54.9	55.0	55.2	55.4	55.7	56.0	56.2	56.5									
70					56.0	56.3	56.6	56.8	57.0	57.2	57.4	57.8	58.0	58.3	58.8	59.1								
72					57.8	58.1	58.3	58.6	58.9	59.1	59.4	59.8	60.0	60.4	60.8	61.2	61.8							
74						59.9	60.1	60.4	60.7	60.9	61.2	61.6	62.0	62.4	62.8	63.2	63.7	64.2						
76						61.4	61.9	62.1	62.4	62.8	63.1	63.3	63.8	64.1	64.6	65.1	65.6	66.1						
78						63.1	63.5	63.8	64.0	64.3	64.7	65.0	65.4	65.8	66.3	66.8	67.3	68.0	68.9					
80						64.6	65.0	65.2	65.6	65.8	66.2	66.6	67.0	67.4	68.0	68.4	69.0	69.6	70.6	71.8				
83							67.1	67.4	67.8	68.0	68.5	68.9	69.3	69.8	70.2	70.8	71.3	71.9	73.0	74.1				
86							69.2	69.5	69.8	70.2	70.6	71.0	71.3	71.8	72.3	72.8	73.4	74.0	75.0	76.2				
90								71.9	72.2	72.6	73.0	73.4	73.9	74.3	74.8	75.3	75.9	76.5	77.5	78.7				
95									75.0	75.3	75.7	76.0	76.5	76.9	77.4	77.9	78.5	79.2	80.2	81.3				
100										77.6	77.9	78.3	78.8	79.3	79.8	80.2	80.8	81.4	82.4	83.6				
105											80.0	80.3	80.8	81.2	81.8	82.2	82.8	83.3	84.3	85.3				
110												82.1	82.5	82.9	83.3	83.8	84.3	84.9	85.8	87.0				
120														85.6	86.1	86.6	87.0	87.6	88.5	89.6				

17.0 | 14.0 | 12.0 | 9.5 | 7.5 | 5.5 | 3.5 | 1.5 | 0.0

Note.—To obtain the effective temperatures for a person stripped to the waist, for any wet and dry bulb reading: subtract from the normally clothed effective temperature, the factor for the particular belt or zone found at the edge of the Table.

The best method of producing effective cooling to be employed in any particular case will depend upon accompanying circumstances and should be determined by a competent engineer. Generally removal of heat or water vapor or both, are most effective. However excepting under unusually favorable circumstances direct cooling or dehumidifying is an expensive process and can only be resorted to where the results will justify the cost. Effective cooling by air motion or evaporation of water is relatively much less expensive. Unfortunately however these methods of cooling are limited to certain conditions of temperature and humidity. Evaporation of water is effective when the air is dry or when there is considerable difference between the wet and dry bulb temperature. Cooling by air motion is most effective at low temperatures. When the effective temperature approaches that of the body little or no cooling results and for certain higher temperatures air motion will make an uncomfortable condition even less bearable.

For moderately high temperatures greater effective cooling is experienced as the result of air motion at high humidities than at low humidities. This suggests a valuable method of cooling by a combination of evaporation and air motion. Take for example a summer condition of 96 deg. dry bulb and 80 deg. wet bulb having an effective temperature of 85.7 deg. A 300 ft. air velocity will improve this condition by only 2.2 deg. Saturation with water vapor will give a condition of 80 deg. dry bulb, 80 deg. wet bulb and 80 deg. effective temperature or 5.7 deg. effective temperature improvement. A 300 ft. air velocity with this new wet and dry bulb will give an effective temperature of 75.7 deg. or a total improvement of 10.0 deg.

Example 1.—Given dry bulb and wet bulb temperatures of 75 and 68 deg. *First:* what is the effective temperature? *Second:* is this condition warmer or cooler than 80 deg. dry bulb and 60 deg. wet bulb?

Answer.—The first condition is given by the intersection of the 75 deg. dry bulb line and the 68 deg. wet bulb line. The effective temperature is given by the numerical value of the effective temperature line, passing through this point and indicated by the scale along the saturation curve, and is 71.9 deg. effective temperature. The second condition is given by the intersection of 80 deg. dry bulb and 60 deg. wet bulb and is 71.7 deg. effective temperature. It is therefore 0.2 deg. effective temperature cooler than the first condition.

Example 2.—Given 76 deg. dry bulb and 61 deg. wet bulb how many degrees difference between this condition and the comfort line or 65 deg. effective temperature?

Answer.—The effective temperature of this condition is given by the intersection of the 76 deg. dry bulb and 61 deg. wet bulb lines and is 70 deg. effective temperature or 5 deg. effective temperature warmer than the comfort line.

Example 3.—Given the dry and wet bulb temperatures in a room of 76 and 54 deg. respectively, what air velocity will be necessary to make this condition ideally comfortable, that is, 65 deg. effective temperature?

Answer.—From Table 93 for still air it will be seen that this condition has an effective temperature of 68.1 deg. in still air. Looking through the various Tables 94 to 99 for moving air it will be found that with a 300 ft. velocity this condition will have an effective temperature of 64.7 deg., and with a velocity of 200 ft. (Table 96) it will have an effective temperature of 65.8 deg. Interpolating between these two velocities the desired velocity is found to be 273 ft. per min.

Example 4.—Given a condition having dry and wet bulb temperatures of 90 and 85 deg. respectively, how much cooler will this condition feel if 300 ft. air velocity is supplied instead of still air?