(Refer to Chapter 35 for coil selection and efficiency.)

From note under Equation 19 the dry-bulb range will be $(80-54.6) \times 0.85 = 21.6$ deg, and the dry-bulb temperature of air leaving the coil will be $80 - 21.6 = 58.4$ F. The dry-bulb temperature leaving the fan (including the heat supplied by the fan motor), or delivered into the room, will be (from Equation 21):

$$t_s = 80 - \frac{184{,}415 - 19{,}100}{1.08 \times 7900} = 80 - 19.4 = 60.6 \text{ F.}$$

With good distribution and diffusion, this temperature should not produce objectionable drafts.

EXAMPLE 18: SUMMARY

Outdoor Conditions	95 DB	78 WB	0.0169 Humidity Ratio
Space Conditions	80 DB	65 WB	0.0098 Humidity Ratio
DIFFERENCE	15		0.0071

SENSIBLE LOAD		
Transmission	Btu/Hr	
Roof 4000 sq ft × 53° × 0.34 =	72,000	
S. Wall 405 sq ft × 6° × 0.41 =	995	
E. Wall 765 sq ft × 11° × 0.52 =	4,380	
N. Wall Ex. 170 sq ft × 3° × 0.52 =	265	
N. & W. Party Wall 1065 sq ft × 2° × 0.26 =	550	
Floor None		
Door 35 sq ft × 15 × 0.59 =	310	
All Glass and Rest of Doors =	3,020	
Solar Radiation		
S. Glass 60 sq ft × 14 =	840	
S. Glass (Doors) 35 sq ft × 42 =	1,470	
E. Glass (Doors) 18 sq ft × 14 =	250	
N. Glass 30 sq ft × 15 =	450	
Internal Load		
Infiltration 67 cfm × 1.08 × 15° =	1,085	
Lights (12,000 × 1.20 + 4000) 3.41 =	62,700	
People 85 × 200 =	17,000	
Motor, Fan 7.5 hp × 2544 =	19,100	
TOTAL SENSIBLE SPACE LOAD		184,415
LATENT LOAD		
Infiltration 67 cfm × 4840 × 0.0071 =	2,300	
People 85 × 250 =	21,250	
TOTAL LATENT SPACE LOAD		23,550
VENTILATION AIR		
Sensible 1275 cfm × 1.08 × 15° =		20,700
Latent 1275 cfm × 4840 × 0.0071 =		43,800
GRAND TOTAL LOAD		272,465

LETTER SYMBOLS USED IN CHAPTER 12

α = fraction of incident solar radiation absorbed, dimensionless; subscripts D, d, t refer to direct, diffuse and total, respectively.
β = solar altitude, degrees.
γ = wall solar-azimuth, degrees.
ϵ = emissivity, dimensionless.
θ = incident angle, degrees.
λ = amplitude decrement factor, dimensionless.
μ = permeability to moisture transmission, grains per (square foot) (hour) (inch mercury).

τ = fraction of incident solar radiation transmitted, dimensionless. Subscripts D, d, t refer to direct, diffuse and total, respectively.
ϕ = solar azimuth, degrees.
ψ = wall azimuth, degrees.
A = area across which heat is being transferred, square feet.
f = unit surface conductance, Btu per (hour) (square foot) (Fahrenheit degree). Subscripts c, r, o, and i refer to convection, radiation, outdoor, and indoor, respectively.
G_l = fraction of total window area receiving direct solar radiation when shaded by window reveal, dimensionless.
h = enthalpy of air per pound of dry air, Btu per pound. Subscripts i, o, and s refer to indoor, outdoor, and supply air, respectively.
I = incident solar radiation, Btu per (hour) (square foot). Subscripts D, d, Dn, and t refer to direct, diffuse, direct normal and total solar radiation, respectively.
K = cosine of angle of incidence for direct solar radiation striking a surface, dimensionless.
k = thermal conductivity of building material, Btu per (square foot) (hour) (Fahrenheit degree per inch).
L = thickness of building material, inches.
l = height of window, feet.
Q = rate of entry of outdoor air, cubic feet per minute.
Q_{ra} = required air quantity through conditioning equipment, cubic feet per minute.
q = instantaneous rate of heat transfer, Btu per hour.
q_e = instantaneous latent heat load, Btu per hour.
q_m = latent heat load due to moisture transmission through materials, Btu per (hr) (sq ft).
q_s = instantaneous sensible heat load, Btu per hour.
q_t = $q_e + q_s$, Btu per hour.
R_a = low temperature radiant energy received from outdoor surroundings (does not include solar radiation), Btu per (hr)(sq ft of receiving surface).
R = radiant energy emitted by a black body, Btu per (hr) (sq ft). Subscripts go and L refer to outdoor surfaces of glass and building, respectively.
S = rate of heat storage within a glass section, Btu per (hr)(sq ft).
t_e = sol-air temperature, Fahrenheit degrees.
t_e^* = sol-air temperature at a time earlier than the time for which heat gain is being found by an amount that is equal to the time lag of the wall or roof, Fahrenheit degrees.
t_{gi} = temperature of indoor glass surface, Fahrenheit degrees.
t_{go} = temperature of outdoor glass surface, Fahrenheit degrees.
t_i = indoor air temperature, Fahrenheit degrees.
t_L = temperature of outer surface of building, Fahrenheit degrees.
t_m = 24-hr cyclic average sol-air temperature, Fahrenheit degrees.
t_o = outdoor air temperature, Fahrenheit degrees.
t_p = $t_m + (t_e^* - t_m)$, *net* equivalent outdoor temperature for combined periodic and mean heat flow, Fahrenheit degrees.
t_s = room supply air dry-bulb temperature, Fahrenheit degrees.
U = overall coefficient of heat transfer of a structural section, Btu per (square foot) (hour) (Fahrenheit degree).
v_o = volume of outdoor air per pound of dry air, cubic feet.
w = width of window, feet.
W = humidity ratio, pounds moisture per pound of dry air. Subscripts i, o, and s refer to indoor, outdoor, and supply air, respectively.