

# Heating Load Rules of Thumb

### **7.01 All Buildings and Spaces**

- A. 20–60 Btuh/Sq.Ft.
- B. 25–40 Btuh/Sq.Ft. Average

### **7.02 Buildings w/100% OA Systems (i.e., Laboratories, Hospitals)**

- A. 40–120 Btuh/Sq.Ft.

### **7.03 Buildings w/Ample Insulation, Few Windows**

- A. AC Tons  $\times$  12,000 Btuh/Ton  $\times$  1.2

### **7.04 Buildings w/Limited Insulation, Many Windows**

- A. AC Tons  $\times$  12,000 Btuh/Ton  $\times$  1.5

### **7.05 Walls Below Grade (Heat Loss at Outside Air Design Condition)**

- A.  $-30^{\circ}\text{F.}$ –6.0 Btuh/Sq.Ft.
- B.  $-25^{\circ}\text{F.}$ –5.5 Btuh/Sq.Ft.
- C.  $-20^{\circ}\text{F.}$ –5.0 Btuh/Sq.Ft.
- D.  $-15^{\circ}\text{F.}$ –4.5 Btuh/Sq.Ft.
- E.  $-10^{\circ}\text{F.}$ –4.0 Btuh/Sq.Ft.
- F.  $-5^{\circ}\text{F.}$ –3.5 Btuh/Sq.Ft.
- G.  $0^{\circ}\text{F.}$ –3.0 Btuh/Sq.Ft.
- H.  $5^{\circ}\text{F.}$ –2.5 Btuh/Sq.Ft.
- I.  $10^{\circ}\text{F.}$ –2.0 Btuh/Sq.Ft.
- J.  $15^{\circ}\text{F.}$ –1.9 Btuh/Sq.Ft.
- K.  $20^{\circ}\text{F.}$ –1.8 Btuh/Sq.Ft.
- L.  $25^{\circ}\text{F.}$ –1.7 Btuh/Sq.Ft.
- M.  $30^{\circ}\text{F.}$ –1.5 Btuh/Sq.Ft.

## **7.06 Floors Below Grade (Heat Loss at Outside Air Design Condition)**

- A.  $-30^{\circ}\text{F.}-3.0 \text{ Btuh/Sq.Ft.}$
- B.  $-25^{\circ}\text{F.}-2.8 \text{ Btuh/Sq.Ft.}$
- C.  $-20^{\circ}\text{F.}-2.5 \text{ Btuh/Sq.Ft.}$
- D.  $-15^{\circ}\text{F.}-2.3 \text{ Btuh/Sq.Ft.}$
- E.  $-10^{\circ}\text{F.}-2.0 \text{ Btuh/Sq.Ft.}$
- F.  $-5^{\circ}\text{F.}-1.8 \text{ Btuh/Sq.Ft.}$
- G.  $0^{\circ}\text{F.}-1.5 \text{ Btuh/Sq.Ft.}$
- H.  $5^{\circ}\text{F.}-1.3 \text{ Btuh/Sq.Ft.}$
- I.  $10^{\circ}\text{F.}-1.0 \text{ Btuh/Sq.Ft.}$
- J.  $15^{\circ}\text{F.}-0.9 \text{ Btuh/Sq.Ft.}$
- K.  $20^{\circ}\text{F.}-0.8 \text{ Btuh/Sq.Ft.}$
- L.  $25^{\circ}\text{F.}-1.7 \text{ Btuh/Sq.Ft.}$
- M.  $30^{\circ}\text{F.}-0.5 \text{ Btuh/Sq.Ft.}$

## **7.07 Heating System Selection Guidelines**

- A. If heat loss exceeds 450 Btu/Hr. per lineal feet of wall, heat should be provided from under the window or from the base of the wall to prevent downdrafts.
- B. If heat loss is between 250 and 450 Btu/Hr. per lineal feet of wall, heat should be provided from under the window or from the base of the wall, or it may be provided from overhead diffusers, located adjacent to the perimeter wall, discharging air directly downward, blanketing the exposed wall and window areas.
- C. If heat loss is less than 250 Btu/Hr. per lineal feet of wall, heat should be provided from under the window or from the base of the wall, or it may be provided from overhead diffusers, located adjacent to or slightly away from the perimeter wall, discharging air directed at, or both directed at and directed away, from the exposed wall and window areas.

## **7.08 Heating Load Calculation Procedure**

- A. Obtain building characteristics:
  1. Materials
  2. Size
  3. Color
  4. Shape

5. Location
6. Orientation, N, S, E, W, NE, SE, SW, NW, etc.
7. External shading
8. Occupancy type and time of day

**B. Select outdoor design weather conditions:**

1. Temperature.
2. Wind direction and speed.
3. Conditions in selecting outdoor design weather conditions:
  - a. Type of structure, heavy, medium or light.
  - b. Is structure insulated?
  - c. Is structure exposed to high wind?
  - d. Infiltration or ventilation load.
  - e. Amount of glass.
  - f. Time of building occupancy.
  - g. Type of building occupancy.
  - h. Length of reduced indoor temperature.
    - i. What is daily temperature range, minimum/maximum?
    - j. Are there significant variations from ASHRAE weather data?
    - k. What type of heating devices will be used?
      - l. Expected cost of fuel.
4. See Part 16, Energy Conservation and Design Conditions, for code restrictions on selection of outdoor design conditions.

**C. Select indoor design temperature to be maintained in each space. See Part 16, Energy Conservation and Design Conditions, for code restrictions on selection of indoor design conditions.**

**D. Estimate temperatures in un-heated spaces.**

**E. Select and/or compute U-values for walls, roof, windows, doors, partitions, etc.**

**F. Determine area of walls, windows, floors, doors, partitions, etc.**

**G. Compute heat transmission losses for all walls, windows, floors, doors, partitions, etc.**

**H. Compute heat losses from basement and/or grade level slab floors.**

**I. Compute infiltration heat losses.**

**J. Compute ventilation heat loss required.**

**K. Compute sum of all heat losses indicated in items G, H, I, and J above.**

**L. For a building with sizable and steady internal heat release, a credit may be taken, but only a portion of the total. Use extreme caution!!! For most buildings, credit for heat gain should not be taken.**

**M. Include morning warm-up for buildings with intermittent use and night set-back. See Part 16, Energy Conservation and Design Conditions, for code restrictions on excess HVAC system capacity permitted for morning warm-up.**

**N. Consider equipment and materials which will be brought into the building below inside design temperature.**

**O. Heating load calculations should be conducted using industry accepted methods to determine actual heating load requirements.**