

have no interior walls, the infiltration losses are calculated by using one-half of the total crack, in which case the entire infiltration loss should be considered.

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Chapter 6

HEATING LOAD

Heat Demand Design Factors, Method of Procedure, Inside and Outside Temperatures, Wind Velocity Effects, Auxiliary Heat Sources, Wall Condensation, Heat Loss Computation

TO design any system of heating, the maximum probable heat demand must be accurately estimated in order that the apparatus installed shall be capable of maintaining the desired temperature at all times. The factors which govern this maximum heat demand—most of which are seldom, if ever, in equilibrium—include the following:

- | | |
|---|---------------------------------------|
| 1. Outside temperature. | } Outside Conditions
(The Weather) |
| 2. Rain or snow. | |
| 3. Sunshine or cloudiness. | |
| 4. Wind velocity. | |
| 5. Heat transmission of exposed parts of building. | } Building
Construction |
| 6. Infiltration of air through cracks, crevices and open doors and windows. | |
| 7. Heat capacity of materials. | |
| 8. Rate of absorption of solar radiation by exposed materials. | |
| 9. Inside temperatures. | } Inside
Conditions |
| 10. Stratification of air. | |
| 11. Type of heating system. | |
| 12. Ventilation requirements. | |
| 13. Period and nature of occupancy. | |
| 14. Temperature regulation. | |

The *inside conditions* vary from time to time, the physical properties of the *building construction* may change with age, and the *outside conditions* are changing constantly. Just what the worst combination of all of these variable factors is likely to be in any particular case is therefore conjectural. Because of the nature of the problem, extreme precision in estimating heat losses at any time, while desirable, is hard to attain.

The procedure to be followed in determining the heat loss from any building can be divided into seven consecutive steps, as follows:

1. Determine on the inside air temperature, at the breathing line or the 30-in. line, which is to be maintained in the building during the coldest weather. (See Table 1.)
2. Determine on an outside air temperature for design purposes, based on the minimum temperatures recorded in the locality in question, which will provide for all but the most severe weather conditions. Such conditions as may exist for only a few consecutive hours are readily taken care of by the heat capacity of the building itself. (See Table 2.)
3. Select or compute the heat transmission coefficients for outside walls and glass; also for inside walls, floors, or top-floor ceilings, if these are next to unheated space; include roof if next to heated space. (See Chapter 4.)