

coefficient of a surface in still air is 1.65 Btu per hour per square foot per degree Fahrenheit, whereas the average coefficient of an air space in an outside wall is about 1.10 Btu per hour per square foot per degree Fahrenheit difference between the two surfaces, at a mean temperature of 40 F. An air space coefficient of 1.10 is equivalent to a surface coefficient of 2.20 for each of the two surfaces enclosing the air space, where the over-all transmission is computed by using the coefficients of the two surfaces enclosing the air space instead of the coefficient of the air space itself. Hence, in determining the values of U_r and U_{ce} to be used in the formula, the coefficients for the surfaces of the roof and ceiling enclosing the attic should be increased to allow for the additional amount of heat transferred by radiation, and a coefficient of 2.20 may be used with sufficient accuracy for each of these surfaces, although in very precise work a correction should be made to allow for the fact that the area of a pitched roof over an unheated attic is greater than the area of the ceiling, and hence, the amount of heat absorbed by radiation by each square foot of roof surface is less than is given off by radiation by each square foot of ceiling surface.

If the unheated attic space between the roof and ceiling has no dormers, windows or vertical wall surfaces, the combined coefficients may be used for determining the heat loss through the roof construction between the attic and top-floor ceiling, but it should be noted that these coefficients should be multiplied by the roof area and not by the ceiling area. If the unheated attic contains windows, ventilators or vertical wall surfaces, which would tend to reduce temperature in the attic to a temperature approaching or equaling the outside temperature, the roof should be neglected and only the top-floor ceiling construction and the corresponding ceiling area taken into consideration, using the coefficients given in Tables 8 or 9. Where there are no dormers, doors, or windows, and when the transmission coefficients of the roof and the ceiling are approximately the same, the value of the attic temperature may be taken as an average between the inside and the outside temperature.

Basements and Unheated Rooms

The heat loss through floors into basements and into unheated rooms kept closed may be computed by assuming a temperature for these rooms of 32 F.

Additional information on the inside and outside temperatures to be used in heat loss calculations is given in Chapter 7.

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PROBLEMS IN PRACTICE

- 1 • What is the conductance of a 1-in. air space, faced with common building materials, at a mean temperature of 50 F?
1.152 (Table 1).
- 2 • What is the conductivity of face brick?
9.20 (Table 2).
- 3 • What is the conductance of wood shingles?
1.28 (Table 2).
- 4 • What is the over-all coefficient of transmission U for a solid brick wall 12-in. thick with plaster on wood lath, furred?
0.24 (Table 3, Wall 2C).
- 5 • Find the value of U for a 6-in. concrete wall with plaster on metal lath attached to 2-in. furring strips with flanged $\frac{1}{2}$ -in. blanket insulation.
0.23 (Table 3, Wall 12L).
- 6 • Find the value of U for a wood siding wall with an interior finish of $\frac{3}{4}$ -in. plaster on metal lath; sheathing thickness, $2\frac{5}{32}$ in.
0.26 (Table 5, Wall 41B).
- 7 • What value of U should be used for a brick veneer wall with $\frac{1}{2}$ -in. rigid insulation sheathing finished on the interior with plaster on $\frac{1}{2}$ -in. rigid insulation?
0.19 (Table 5, Wall 51D).
- 8 • What value of U should be used in computing the heat loss from an attic through a floor of yellow pine on joists with a ceiling of metal lath and plaster?
0.30 (Table 8, Floor 2B).
- 9 • What is the over-all heat transfer coefficient for a 6-in. concrete floor with no insulation and with yellow pine flooring on sleepers resting on concrete?
0.33 (Table 10, Floor 2B).
- 10 • What is the coefficient U for a flat roof of 4-in. concrete with a metal lath and plaster ceiling insulated with 1-in. cork board?
0.17 (Table 11, Roof 3N).