*Table 5.3.2 Thermal Resistances, $R_f$, of Surfaces[1].*

| Position of surface | Direction of heat flow | Indoor – Still Air, $R_{fi}$ | | | Outdoor – Moving Air, $R_{fo}$ | |
|---|---|---|---|---|---|---|
| | | | Reflective surface | | Non-reflective surface | |
| | | Non-reflective surface | Aluminum-coated paper, polished | Bright aluminum foil | 15 mph wind, winter design | 7.5 mph wind, summer design |
| Vertical | Horizontal | 0.68 | 1.35 | 1.70 | 0.17 | 0.25 |
| Horizontal | Up | 0.61 | 1.10 | 1.32 | 0.17 | 0.25 |
| | Down | 0.92 | 2.70 | 4.55 | 0.17 | 0.25 |

1. *ASHRAE Handbook of Fundamentals*, 2005, www.ASHRAE.org.

*Table 5.3.3 Thermal Resistances, $R_a$, of Air Spaces[1].*

| Position of Air Space | Direction of Heat Flow | Air Space | | Non-Reflective Surfaces | Reflective Surfaces | | |
|---|---|---|---|---|---|---|---|
| | | Mean temp., °F | Temp. difference, °F | | One side[2] | One side[3] | Both sides[3] |
| Vertical | Horizontal (walls) | **Winter** | | | | | |
| | | 50 | 10 | 1.01 | 2.32 | 3.40 | 3.63 |
| | | 50 | 30 | 0.91 | 1.89 | 2.55 | 2.67 |
| | Horizontal (walls) | **Summer** | | | | | |
| | | 90 | 10 | 0.85 | 2.15 | 3.40 | 3.69 |
| Horizontal | Up (roofs) | **Winter** | | | | | |
| | | 50 | 10 | 0.93 | 1.95 | 2.66 | 2.80 |
| | | 50 | 30 | 0.84 | 1.58 | 2.01 | 2.09 |
| | Down (floors) | 50 | 30 | 1.22 | 3.86 | 8.17 | 9.60 |
| | | 50 | 10 | 1.24 | 4.09 | 9.27 | 11.15 |
| | Down (roofs) | **Summer** | | | | | |
| | | 90 | 10 | 1.00 | 3.41 | 8.19 | 10.07 |

1 For 3½ in. air space thickness. The values, with the exception of those for reflective surfaces, heat flow down, will differ about 10% for air space thicknesses of ¾ in. to 6 in. Refer to the *ASHRAE Handbook of Fundamentals* for values of other thicknesses, reflective surfaces, heat flow directions, mean temperatures, and temperature differentials. *ASHRAE Handbook of Fundamentals*, 2005, www.ASHRAE.org.

2 Aluminum painted paper.

3 Bright aluminum foil.

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