# APPENDIX P

# AIR CONDITIONING SYSTEM DESIGN

*Table P-1. Dimensions of Overall Opening for Double Hung and Wood Casement Windows when Size of Glass is Known*

| Width of Glass in Inches | | | | | | | Width of Opening in Feet |
|---|---|---|---|---|---|---|---|
| 2 Light | 4 Light | 6 Light | 8 Light | 9 Light | 12 Light | 16 Light | |
| 14 | | | | | | | 1'- 6" |
| 16 | | 8 | 8 | | 8 | 8 | 1'- 8" |
| 18 | | 9 | | | | | 1'-10" |
| | | | 9 | | 9 | 9 | 1'-11" |
| 20 | | | | | | | 2'- 0" |
| | 10 | 10 | 10 | | 10 | 10 | 2'- 1" |
| 22 | | 12 | | | | | 2'- 2" |
| 24 | | | | 8 | | | 2'- 4" |
| | 12 | | 12 | | 12 | 12 | 2'- 5" |
| 26 | | | | | | | 2'- 6" |
| 28 | 14 | | 14 | 9 | 14 | 14 | 2'- 8" |
| 30 | | | | 10 | | | 2'-10" |
| 32 | | | | 12 | | | 3'- 0" |
| 34 | | | | | | | 3'- 2" |
| 36 | | | | | | | 3'- 4" |
| 38 | | | | | | | 3'- 6" |
| 40 | | | | | | | 3'- 8" |
| 42 | | | | | | | 3'-10" |
| 44 | | | | | | | 4'- 0" |

| Height of Glass in Inches | | | | | | | Height of Opening in Feet |
|---|---|---|---|---|---|---|---|
| 2 Light | 4 Light | 6 Light | 8 Light | 9 Light | 12 Light | 16 Light | |
| 14 | | | | | | | 2'-10" |
| | | 10 | | 10 | | | 3'- 0" |
| 16 | | | | | | | 3'- 2" |
| 18 | | 12 | | 12 | | | 3'- 6" |
| 20 | 20 | | 10 | | 10 | 10 | 3'-10" |
| | | 14 | | 14 | | | 4'- 0" |
| 22 | 22 | | | | | | 4'- 2" |
| 24 | 24 | | 12 | | 12 | 12 | 4'- 6" |
| 26 | 26 | | 13 | | 13 | 13 | 4'-10" |
| 28 | 28 | | 14 | | 14 | 14 | 5'- 2" |
| 30 | 30 | | | | | | 5'- 6" |
| 32 | 32 | | | | | | 5'-10" |

*Table P-2. Area of Running Feet of Crack of Casement Windows, Including Sash*

Top figures in light type are total area in sq. ft. — bottom figures in bold type are running feet of crack.

| Height of Opening Ft.-In. | Width of Opening—Feet—Inches | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1'-8" | 1'-10" | 2'-1" | 2'-2" | 2'-4" | 2'-8" | 2'-10" | 3'-0" |
| 3'-0" | 5.0<br>**9.3** | 5.5<br>**9.6** | 6.0<br>**10.0** | 6.3<br>**10.5** | 6.9<br>**10.8** | 7.6<br>**11.0** | 8.4<br>**11.6** | 10.0<br>**12.7** |
| 3'-6" | 5.9<br>**10.3** | 6.4<br>**10.6** | 6.9<br>**11.0** | 8.0<br>**11.6** | 8.1<br>**11.7** | 8.9<br>**12.0** | 9.8<br>**12.6** | 11.7<br>**13.6** |
| 3'-9" | 6.4<br>**11.0** | 7.1<br>**11.3** | 7.7<br>**11.7** | 8.9<br>**12.3** | | | | |
| 4'-0" | 6.7<br>**11.3** | 7.3<br>**11.6** | 8.0<br>**12.0** | 9.0<br>**12.7** | | | | |
| 4'-6" | 7.6<br>**12.3** | 8.3<br>**12.7** | 9.7<br>**13.0** | 10.5<br>**13.7** | | | | |
| 5'-0" | 8.7<br>**13.7** | 9.5<br>**14.0** | 10.4<br>**14.3** | 12.1<br>**15.0** | | | | |

*Table P-3. Area of Running Feet of Crack of Double Hung Windows, Including Sash*

**Note: Top figures in light type are total area in sq. ft. — bottom figures in bold type are running feet of crack.**

| HEIGHT OF Opening Ft.-In. | WIDTH OF OPENING—FEET—INCHES | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1'-8" | 1'-8" | 1'-10" | 1'-11" | 2'-0" | 2'-1" | 2'-2" | 2'-4" | 2'-5" | 2'-6" | 2'-8" | 2'-10" | 3'-0" | 3'-2" | 3'-4" | 3'-6" | 3'-8" | 3'-10" | 4'-0" |
| 2'-10" | 4.2 | 4.7 | 5.2 | 5.4 | 5.7 | 5.9 | 6.1 | 6.6 | 6.8 | 7.1 | 7.6 | 8.0 | 8.5 | 9.0 | 9.4 | 9.9 | 10.4 | 10.9 | 11.3 |
| | **10.2** | **10.7** | **11.2** | **11.5** | **11.7** | **12.0** | **12.2** | **12.7** | **13.0** | **13.2** | **13.7** | **14.2** | **14.7** | **15.2** | **15.7** | **16.2** | **16.7** | **17.2** | **17.7** |
| 3'- 2" | 4.7 | 5.3 | 5.8 | 6.0 | 6.3 | 6.6 | 6.9 | 7.4 | 7.6 | 7.9 | 8.4 | 9.0 | 9.5 | 10.0 | 10.6 | 11.1 | 11.6 | 12.1 | 12.7 |
| | **10.8** | **11.3** | **11.8** | **12.1** | **12.3** | **12.6** | **12.8** | **13.3** | **13.6** | **13.8** | **14.3** | **14.8** | **15.3** | **15.8** | **16.3** | **16.8** | **17.3** | **17.8** | **18.3** |
| 3'- 6" | 5.3 | 5.8 | 6.4 | 6.7 | 7.0 | 7.3 | 7.6 | 8.2 | 8.5 | 8.8 | 9.3 | 10.0 | 10.5 | 11.1 | 11.7 | 12.3 | 12.8 | 13.4 | 14.0 |
| | **11.5** | **12.0** | **12.5** | **12.8** | **13.0** | **13.3** | **13.5** | **14.0** | **14.3** | **14.5** | **15.0** | **15.5** | **16.0** | **16.5** | **17.0** | **17.5** | **18.0** | **18.5** | **19.0** |
| 3'-10" | 5.7 | 6.4 | 7.0 | 7.3 | 7.7 | 8.0 | 8.3 | 8.9 | 9.2 | 9.6 | 10.2 | 10.9 | 11.5 | 12.1 | 12.8 | 13.4 | 14.1 | 14.7 | 15.3 |
| | **12.2** | **12.7** | **13.2** | **13.6** | **13.7** | **13.9** | **14.2** | **14.7** | **14.9** | **15.2** | **15.7** | **16.2** | **16.7** | **17.2** | **17.7** | **18.2** | **18.7** | **19.2** | **19.7** |
| 4'- 2" | 6.2 | 7.0 | 7.6 | 8.0 | 8.3 | 8.6 | 9.0 | 9.7 | 10.0 | 10.4 | 11.1 | 11.8 | 12.5 | 13.2 | 13.9 | 14.6 | 15.3 | 16.0 | 16.7 |
| | **12.8** | **13.3** | **13.8** | **14.0** | **14.3** | **14.6** | **14.8** | **15.3** | **15.6** | **15.8** | **16.3** | **16.8** | **17.3** | **17.8** | **18.3** | **18.8** | **19.3** | **19.8** | **20.3** |
| 4'- 6" | 6.8 | 7.5 | 8.2 | 8.6 | 9.0 | 9.3 | 9.7 | 10.5 | 10.9 | 11.3 | 12.0 | 12.7 | 13.5 | 14.2 | 15.0 | 15.8 | 16.5 | 17.2 | 18.0 |
| | **13.5** | **14.0** | **14.5** | **14.8** | **15.0** | **15.3** | **15.5** | **16.0** | **16.3** | **16.5** | **17.0** | **17.5** | **18.0** | **18.5** | **19.0** | **19.5** | **20.0** | **20.5** | **21.0** |
| 4'-10" | 7.2 | 8.1 | 8.9 | 9.3 | 9.7 | 10.1 | 10.5 | 11.3 | 11.7 | 12.1 | 12.9 | 13.7 | 14.5 | 15.3 | 16.1 | 16.9 | 17.7 | 18.5 | 19.3 |
| | **14.2** | **14.7** | **15.2** | **15.5** | **15.7** | **15.9** | **16.2** | **16.7** | **16.9** | **17.2** | **17.7** | **18.2** | **18.7** | **19.2** | **19.7** | **20.2** | **20.7** | **21.2** | **21.7** |
| 5'- 2" | 7.7 | 8.6 | 9.5 | 10.0 | 10.3 | 10.8 | 11.2 | 12.1 | 12.6 | 12.9 | 13.8 | 14.6 | 15.5 | 16.4 | 17.2 | 18.1 | 18.9 | 19.8 | 20.7 |
| | **14.8** | **15.3** | **15.8** | **16.1** | **16.3** | **16.6** | **16.8** | **17.3** | **17.6** | **17.8** | **18.3** | **18.8** | **19.3** | **19.8** | **20.3** | **20.8** | **21.3** | **21.8** | **22.3** |
| 5'- 6" | 8.3 | 9.2 | 10.1 | 10.6 | 11.0 | 11.5 | 11.9 | 12.8 | 13.3 | 13.8 | 14.7 | 15.6 | 16.5 | 17.4 | 18.3 | 19.3 | 20.2 | 21.4 | 22.0 |
| | **15.5** | **16.0** | **16.5** | **16.8** | **17.0** | **17.3** | **17.5** | **18.0** | **18.3** | **18.5** | **19.0** | **19.5** | **20.0** | **20.5** | **21.0** | **21.5** | **22.0** | **22.5** | **23.0** |
| 5'-10" | 8.7 | 9.7 | 10.7 | 11.2 | 11.7 | 12.2 | 12.6 | 13.6 | 14.1 | 14.6 | 15.6 | 16.5 | 17.5 | 18.5 | 19.4 | 20.4 | 21.4 | 22.4 | 23.3 |
| | **16.2** | **16.7** | **17.2** | **17.5** | **17.7** | **17.9** | **18.2** | **18.7** | **18.9** | **19.2** | **19.7** | **20.2** | **20.7** | **21.2** | **21.7** | **22.2** | **22.7** | **23.2** | **23.7** |

## *Table P-4.① Heat Gain Factors for Cooling Calculations*

In any given locality, use only the design temperature difference for that locality in selecting conduction heat gain factors. The varying temperature differences for interior partitions and floors have been provided for in the design temperature column.

| DESCRIPTION | Heat Transmission Coefficient U | Conduction Heat Gain Factors (Multiply values shown by exposed areas) Design Temp. Diff. °F | | | | Solar Heat Gain Factors (Multiply values shown by exposed areas) Direction Window Faces | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 10 | 15 | 20 | 25 | S | SW | W | NW |
| **WINDOWS** | | | | | | | | | |
| No. 1 | | | | | | | | | |
| (a) Single glass | 1.13 | 11.3 | 17.0 | 22.6 | 28.2 | | | | |
| (b) Double glass | 0.45 | 4.5 | 6.7 | 9.0 | 11.2 | | | | |
| (c) Double glass with sealed air space between | 0.65 | 6.5 | 9.8 | 13.0 | 16.3 | | | | |
| (d) Windows, bare | 1.13 | | | | | 2.3 | 131 | 195 | 129 |
| (e) Windows, light shades | 1.13 | | | | | | 65 | 98 | 62 |
| (f) Windows, awnings | 1.13 | | | | | | 38 | 59 | 27 |
| No. 2 | | | | | | | | | |
| (a) Doors are figured the same as though they were windows for Conduction Heat Gain. For Solar Gain use factors for "light shades" | | | | | | | | | |

| **EXPOSED WALLS** | | | | | | Direction Wall Faces & Color | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. 3 — Wood Siding | | | | | | S | | SW | | W | | NW |
| | | | | | | Dark | Light | Dark | Light | Dark | Light | Dark Light |
| (a) Frame, wood siding, paper, sheathing, lath and plaster or gypsum board | 0.25 | 2.5 | 3.8 | 5.0 | 6.3 | 1.0 | 0.5 | 4.5 | 2.0 | 4.0 | 1.7 | 0.5 |
| (b) Same as (a) with ½" flexible insulation between studs in contact with sheathing | 0.17 | 1.7 | 2.6 | 3.4 | 4.3 | 0.7 | 0.4 | 3.1 | 1.4 | 2.7 | 1.2 | 0.3 |
| (c) Same as (a) with 2" blanket or bat insulation between studs | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 0.5 | 0.2 | 2.2 | 1.0 | 1.9 | 0.8 | 0.2 |
| (d) Same as (a) with 3⅝" mineral wool or equivalent between studs | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 0.4 | 0.2 | 1.6 | 0.7 | 1.4 | 0.6 | 0.2 |
| (e) Same as (a) substituting 25/32" rigid insulation for wood sheathing | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 | 0.8 | 0.4 | 3.4 | 1.5 | 3.0 | 1.3 | 0.4 |
| (f) Same as (a) substituting ½" gypsum sheathing for wood sheathing | 0.32 | 3.2 | 4.8 | 6.4 | 8.0 | 1.3 | 0.7 | 5.8 | 2.6 | 5.1 | 2.2 | 0.6 |
| (g) Same as (a) substituting ½" rigid insulation for lath | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 | 0.8 | 0.4 | 3.4 | 1.5 | 3.0 | 1.3 | 0.4 |
| (h) ¾" redwood siding, studs, ½" gypsum board | 0.34 | 3.4 | 5.1 | 6.8 | 8.5 | 1.4 | 0.7 | 6.1 | 2.7 | 5.5 | 2.4 | 0.7 |
| No. 4 — Asphalt or Asbestos Shingles | | | | | | | | | | | | |
| (a) Asphalt or asbestos shingles, paper, sheathing, lath and plaster or gypsum board | 0.30 | 3.0 | 4.5 | 6.0 | 7.5 | 1.2 | 0.6 | 5.4 | 2.4 | 4.8 | 2.1 | 0.6 |
| (b) Same as (a) with ½" flexible insulation between studs in contact with sheathing | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 | 0.8 | 0.4 | 3.4 | 1.5 | 3.0 | 1.3 | 0.4 |
| (c) Same as (a) with 2" blanket insulation between studs | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 0.5 | 0.2 | 2.2 | 1.0 | 1.9 | 0.8 | 0.2 |
| (d) Same as (a) with 3⅝" blanket insulation between studs | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 0.4 | 0.2 | 1.6 | 0.7 | 1.4 | 0.6 | 0.2 |
| (e) Same as (a) with ½" rigid insulation for lath | 0.22 | 2.2 | 3.3 | 4.4 | 5.5 | 0.9 | 0.4 | 4.0 | 1.8 | 3.5 | 1.5 | 0.4 |
| No. 5 — Stucco Siding | | | | | | | | | | | | |
| (a) ¾" stucco on double layer wire mesh building paper, studs, ½" gypsum board or ¼" plywood | 0.48 | 4.8 | 7.2 | 9.6 | 12.0 | 1.9 | 1.0 | 8.6 | 3.8 | 7.9 | 3.4 | 1.0 |

Many of the Heat Transmission coefficients and wall constructions have been reprinted by permission from National Warm Air Heating and Air Conditioning Manual 3.

Conduction heat gain factors and solar heat gain factors are in terms of BTU per hour per square foot of area.

*Table P-4.(c) Heat Gain Factors for Cooling Calculations*—Continued

| DESCRIPTION | U | Conduction Heat Gain Factors (Multiply values shown by exposed areas) | | | | Solar Heat Gain Factors (Multiply values shown by exposed areas) Direction Wall Faces & Color | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Design Temp. Diff. °F | | | | S | | SW | | W | | NW |
| | | 10 | 15 | 20 | 25 | Dark | Light | Dark | Light | Dark | Light | Dark Light |
| **No. 6 Frame with Brick Veneer** | | | | | | | | | | | | |
| (a) Brick veneer — 4" brick, paper, wood sheathing, studs, lath and plaster | 0.27 | 2.7 | 4.0 | 5.4 | 6.7 | 1.0 | 0.5 | 4.9 | 2.2 | 4.4 | 1.9 | .5 |
| (b) Same as (a) substituting ½" rigid insulation for lath | 0.20 | 2.0 | 3.0 | 4.0 | 5.0 | 0.8 | 0.4 | 3.6 | 1.6 | 3.2 | 1.4 | .4 |
| (c) Same as (a) with 2" blanket or bat insulation between studs | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 0.5 | 0.2 | 2.2 | 1.0 | 2.0 | .8 | .2 |
| (d) Same as (a) with 3⅝" mineral wool or equivalent between studs | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 0.4 | 0.2 | 1.6 | .7 | 1.4 | .6 | .2 |
| (e) Same as (a) substituting 25/32" rigid insulation in place of wood sheathing | 0.21 | 2.1 | 3.2 | 4.2 | 5.3 | 0.8 | 0.4 | 3.8 | 1.7 | 3.4 | 1.5 | .4 |
| **No. 7 Brick Wall** | | | | | | | | | | | | |
| (a) 8" Brick wall — plain | 0.50 | 5.0 | 7.5 | 10.0 | 12.5 | 2.0 | 1.0 | 9.0 | 4 | 8 | 3.5 | 1.0 |
| (b) Same as (a) plastered on one side | 0.46 | 4.6 | 6.9 | 1.2 | 11.5 | 1.8 | 0.9 | 8.3 | 3.7 | 7.4 | 3.2 | .9 |
| (c) Same as (a) furred, lath and plaster one side | 0.30 | 3.0 | 4.5 | 6.0 | 7.5 | 1.2 | 0.6 | 5.4 | 2.4 | 4.8 | 2.1 | .6 |
| (d) Same as (c) substituting ½" rigid insulation for the lath | 0.22 | 2.2 | 3.3 | 4.4 | 5.5 | 0.9 | 0.5 | 4.0 | 1.8 | 3.6 | 1.5 | .4 |
| (e) 12" Brick wall — plain | 0.36 | 3.6 | 5.4 | 7.2 | 9.0 | 1.4 | 0.7 | 6.5 | 2.9 | 5.8 | 2.5 | .7 |
| (f) Same as (e) plastered on one side | 0.34 | 3.4 | 5.1 | 6.8 | 8.5 | 1.4 | 0.7 | 6.1 | 2.7 | 5.4 | 2.4 | .8 |
| (g) Same as (e) furred, lath and plaster one side | 0.24 | 2.4 | 3.6 | 4.8 | 6.0 | 1.0 | 0.5 | 4.3 | 1.9 | 3.8 | 1.7 | .5 |
| (h) Same as (e) substituting ½" rigid insulation | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 | 0.8 | 0.4 | 3.4 | 1.5 | 3.0 | 1.3 | .4 |
| **No. 8 Glass Block** | | | | | | | | | | | | |
| (a) 3⅞" Glass block | 0.49 | 4.9 | 7.4 | 9.8 | 12.3 | 2.0 | 1.0 | 8.8 | 3.9 | 7.8 | 3.4 | 1.0 |
| **No. 9 Light Weight Block** | | | | | | | | | | | | |
| (a) 8" Cinder Block—plain | 0.42 | 4.2 | 6.3 | 8.4 | 10.5 | 1.7 | .8 | 7.5 | 3.4 | 6.8 | 2.9 | .8 |
| (b) Same as (a) plastered | 0.39 | 3.9 | 5.8 | 7.8 | 9.7 | 1.5 | .7 | 7.0 | 3.1 | 6.2 | 2.7 | .8 |
| (c) Same as (a) furred, lath and plaster | 0.27 | 2.7 | 4.0 | 5.4 | 6.7 | 1.1 | .5 | 4.9 | 2.2 | 4.4 | 1.9 | .5 |
| (d) Same as (c) substituting ½" rigid insulation for lath | 0.20 | 2.0 | 3.0 | 4.0 | 5.0 | .8 | .4 | 3.6 | 1.6 | 3.2 | 1.4 | .4 |
| (e) 12" Cinder block—plain | 0.38 | 3.8 | 5.7 | 5.6 | 9.5 | 1.5 | .7 | 6.9 | 3.0 | 6.0 | 3.7 | .8 |
| (f) Same as (e) plastered | 0.36 | 3.6 | 5.4 | 5.2 | 9.0 | 1.4 | .7 | 6.5 | 2.9 | 3.8 | 2.5 | .7 |
| (g) Same as (e) furred, lath and plaster | 0.25 | 2.5 | 3.8 | 5.0 | 6.3 | | .5 | 4.5 | 2.0 | 4.0 | 1.7 | .5 |
| (h) Same as (g) substituting ½" rigid insulation for lath | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 | .7 | .4 | 3.4 | 1.5 | 3.0 | 1.3 | .4 |
| **No. 10 Concrete Block** | | | | | | | | | | | | |
| (a) 8" Concrete Block—plain | 0.56 | 5.6 | 8.4 | 11.2 | 14.0 | 2.2 | 1.2 | 10.8 | 4.5 | 9.0 | 3.9 | 1.1 |
| (b) Same as (a) plastered | 0.52 | 5.2 | 7.8 | 10.4 | 13.0 | 2.1 | 1.0 | 9.4 | 4.2 | 8.4 | 3.6 | 1.0 |
| (c) Same as (a) furred, lath and plaster | 0.32 | 3.2 | 4.8 | 6.4 | 8.0 | 1.3 | .6 | 5.8 | 2.5 | 5.0 | 2.2 | .6 |
| (d) Same as (c) substituting ½" rigid insulation for lath | 0.24 | 2.4 | 3.6 | 4.8 | 6.0 | 1.0 | .5 | 4.3 | 1.9 | 3.8 | 1.7 | .5 |
| (e) 12" concrete block | 0.50 | 5.0 | 7.5 | 10.0 | 12.5 | 2.0 | 1.0 | 9.0 | 4.0 | 8.0 | 3.5 | 1.0 |
| (f) Same as (e) plastered | 0.46 | 4.6 | 6.9 | 9.2 | 11.5 | 1.8 | .9 | 8.3 | 3.7 | 7.4 | 3.2 | .9 |
| (g) Same as (e) furred, lath and plaster | 0.30 | 3.0 | 4.5 | 6.0 | 7.5 | 1.2 | .6 | 5.4 | 2.4 | 4.8 | 2.1 | .6 |
| (h) Same as (g) substituting ½" rigid insulation for lath | 0.22 | 2.2 | 3.3 | 4.4 | 5.5 | .9 | .4 | 4.0 | 1.8 | 3.6 | 1.5 | .4 |

*Table P-4.③ Heat Gain Factors for Cooling Calculations*—Continued

| DESCRIPTION | U | Conduction Heat Gain Factors (Multiply values shown by exposed areas) | | | | Solar Heat Gain Factors (Multiply values shown by exposed areas) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Direction Wall Faces & Color | | | | | | | |
| | | Design Temp. Diff. °F | | | | S | | SW | | W | | NW | |
| | | 10 | 15 | 20 | 25 | Dark | Light | Dark | Light | Dark | Light | Dark | Light |
| **No. 11 Stone** | | | | | | | | | | | | | |
| (a) 8" stone—plain | 0.71 | 7.1 | 10.8 | 14.2 | 17.9 | 2.8 | 1.4 | 12.8 | 5.9 | 11.4 | 5.0 | 1.4 | |
| (b) Same as (a) plastered on one side | 0.64 | 6.4 | 9.6 | 12.8 | 16.0 | 2.6 | 1.2 | 11.5 | 1.5 | 10.2 | 4.5 | 1.3 | |
| (c) Same as (a) furred, lath and plaster | 0.37 | 3.7 | 5.6 | 7.4 | 9.3 | 1.5 | .7 | 6.7 | 3.0 | 6.0 | 2.6 | .7 | |
| (d) Same as (c) substituting ½" rigid insulation for lath | 0.25 | 2.5 | 3.8 | 5.0 | 6.3 | 1.0 | .5 | 4.5 | 2.0 | 4.0 | 1.8 | .5 | |
| (e) 12" stone—plain | 0.58 | 5.8 | 8.7 | 11.6 | 14.5 | 2.3 | 1.1 | 10.5 | 4.6 | 9.2 | 4.1 | 1.2 | |
| (f) Same as (e) plastered on one side | 0.53 | 5.3 | 8.0 | 10.6 | 13.3 | 2.1 | 1.1 | 9.5 | 4.2 | 8.4 | 3.7 | 1.1 | |
| (g) Same as (e) furred, lath and plaster | 0.33 | 3.3 | 5.0 | 6.6 | 8.3 | 1.3 | .7 | 6.0 | 2.6 | 5.2 | 2.3 | .7 | |
| (h) Same as (g) substituting ½" rigid insulation for lath | 0.23 | 2.3 | 3.5 | 4.6 | 5.8 | .9 | .5 | 4.2 | 1.8 | 3.6 | 1.6 | .4 | |
| **No. 12 Block or Tile with Brick Veneer** | | | | | | | | | | | | | |
| (a) 4" Brick and 8" Hollow Tile or Cinder Block | 0.34 | 3.4 | 5.1 | 6.8 | 8.5 | 1.4 | 0.7 | 6.1 | 2.7 | 5.4 | 2.4 | .7 | |
| (b) Same as (a) plastered on one side | 0.33 | 3.3 | 5.0 | 6.6 | 8.3 | 1.3 | 0.6 | 6.0 | 2.6 | 5.2 | 2.3 | .7 | |
| (c) Same as (a) furred, lath and plaster | 0.24 | 2.4 | 3.6 | 4.8 | 6.0 | 1.0 | 0.5 | 4.3 | 1.9 | 3.8 | 1.7 | .5 | |
| (d) Same as (c) substituting ½" rigid insulation for lath | 0.18 | 1.8 | 2.7 | 3.6 | 4.5 | 0.7 | 0.4 | 3.2 | 1.5 | 3.0 | 1.3 | .4 | |
| (e) 4" Brick and 8" Concrete Block | 0.44 | 4.4 | 6.6 | 8.8 | 11.0 | 1.8 | 0.9 | 7.9 | 3.5 | 7.0 | 3.1 | .8 | |
| **INTERIOR PARTITIONS** | | | | | | | | | | | | | |
| **No. 13 Frame Partition** | | | | | | | | | | | | | |
| (a) With lath and plaster one side; other side open | 0.62 | 3.1 | 6.2 | 9.3 | 12.4 | | | | | | | | |
| (b) Same as (a) substituting ½" rigid insulation for lath | 0.35 | 1.8 | 3.5 | 5.2 | 7.0 | | | | | | | | |
| (c) Same as (a) with ½" rigid insulation on opposite side | 0.25 | 1.2 | 2.5 | 7.8 | 5.0 | | | | | | | | |
| (d) Same as (a) with 2" blanket or bat insulation between studs* | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | | | | | | | | |
| (e) Same as (a) with 3⅝" mineral wool insulation or equivalent* | 0.09 | .9 | 1.4 | 1.8 | 2.3 | | | | | | | | |
| (f) With lath and plaster both sides | 0.34 | 1.7 | 3.4 | 5.1 | 6.8 | | | | | | | | |
| (g) Same as (f) substituting ½" rigid insulation for lath | 0.18 | 0.9 | 1.8 | 2.7 | 3.6 | | | | | | | | |

| DESCRIPTION | U | Conduction Heat Gain Factors (Multiply values shown by exposed areas) | | | | Solar Heat Gain Factors (Multiply values shown by exposed areas) | |
|---|---|---|---|---|---|---|---|
| | | Design Temp. Diff. °F | | | | Color Roof | |
| | | 10 | 15 | 20 | 25 | Dark | Light |
| **CEILING WITH ATTIC SPACE ABOVE** | | | | | | | |
| **No. 14 No Floor** | | | | | | | |
| (a) Lath and plaster, no floor above (No attic vent) | 0.32 | 3.2 | 4.8 | 6.4 | 8.0 | 20.6 | 11.2 |
| (b) Same (Ventilated attic) | 0.69 | 6.9 | 10.4 | 13.8 | 17.3 | 13.8 | 10.4 |
| (c) Same as (a) substituting ½" rigid insulation for lath (No attic vent) | 0.23 | 2.3 | 3.4 | 4.6 | 5.7 | 12.9 | 8.0 |
| (d) Same (Ventilated attic) | 0.35 | 3.5 | 5.2 | 7.0 | 8.7 | 7.0 | 5.2 |
| (e) Same as (a) with ½" rigid insulation on top of joists (No attic vent) | 0.18 | 1.8 | 2.7 | 3.6 | 4.5 | 10.0 | 2.7 |
| (f) Same (Ventilated attic) | 0.25 | 2.5 | 3.8 | 5.0 | 6.3 | 5.0 | 3.8 |
| (g) Same as (b) with 2" blanket or bat insulation between joists | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 2.4 | 1.8 |
| (h) Same as (19b) with 3⅝" mineral wool or equivalent between joists | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 1.8 | 1.4 |

*Temperature on warm side of these partitions assumed to be outdoor temperature.

*Table P-4.④ Heat Gain Factors for Cooling Calculations*—Continued

| DESCRIPTION | | U | Conduction Heat Gain Factors (Multiply values shown by exposed areas) Design Temp. Diff. °F 10 | 15 | 20 | 25 | Solar Heat Gain Factors (Multiply values shown by exposed areas) Color Roof Dark | Light |
|---|---|---|---|---|---|---|---|---|
| **No. 15 With Floor** | | | | | | | | |
| (a) Lath and plaster with tight floor above (No attic vent) | | 0.20 | 2.0 | 3.0 | 4.0 | 5.0 | 11.2 | 7.0 |
| (b) Same (Ventilated attic) | | 0.28 | 2.8 | 4.2 | 5.6 | 7.0 | 5.6 | 4.2 |
| (c) Same as (a) substituting ½" rigid insulation for the lath (No attic vent) | | 0.16 | 1.6 | 2.4 | 3.2 | 4.0 | 9.0 | 5.6 |
| (d) Same (Ventilated attic) | | 0.21 | 2.1 | 3.2 | 4.2 | 5.3 | 4.1 | 3.2 |
| (e) Same as (b) with 2" blanket or bat between joists | | 0.11 | 1.1 | 1.6 | 2.2 | 2.7 | 2.2 | 1.6 |
| (f) Same as (b) with 3⅝" mineral wool or equivalent between joists | | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 1.8 | 1.4 |
| **CEILING — PART OF ROOF** | | | | | | | | |
| **No. 16 Pitched Roof** | | | | | | | | |
| (a) Lath and plaster, rafter, sheathing, shingles | | 0.29 | 2.9 | 4.4 | 5.8 | 7.3 | 16.2 | 10.1 |
| (b) Same as (a) substituting ½" rigid insulation for the lath | | 0.21 | 2.1 | 3.2 | 4.2 | 5.3 | 11.7 | 7.4 |
| (c) Same as (a) with 2" blanket or bat insulation between rafters | | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 6.7 | 4.2 |
| (d) Same as (a) with 3⅝" mineral wool or equivalent between rafters | | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 5.1 | 3.2 |
| **No. 17 Flat Roof — No Ceiling** | | | | | | | | |
| (a) No insulation | 1" | 0.49 | 4.9 | 7.4 | 9.8 | 17.3 | 27.4 | 17.2 |
| | 2" | 0.32 | 3.2 | 4.8 | 6.4 | 8.0 | 18 | 11.2 |
| (b) ½" rigid insulation (no air space) | 1" | 0.28 | 2.8 | 4.2 | 5.6 | 7.0 | 15.7 | 9.7 |
| | 2" | 0.22 | 2.2 | 3.3 | 4.4 | 5.5 | 12.4 | 7.7 |
| (c) 1" rigid insulation (no air space) | 1" | 0.20 | 2.0 | 3.0 | 4.0 | 5.0 | 11.2 | 7.0 |
| | 2" | 0.16 | 1.6 | 2.4 | 3.2 | 4.0 | 9.0 | 5.6 |
| **No. 18 Flat Roof — With Ceiling** | | | | | | | | |
| (a) Lath and plaster ceiling, no insulation | 1" | 0.30 | 3.0 | 4.5 | 6.0 | 7.5 | 16.8 | 10.5 |
| | 2" | 0.23 | 2.3 | 3.4 | 4.6 | 5.7 | 12.9 | 8.0 |
| (b) Same as (a) with ½" rigid insulation instead of lath | 1" | 0.22 | 2.2 | 3.3 | 4.4 | 5.5 | 12.3 | 7.7 |
| | 2" | 0.18 | 1.8 | 2.4 | 3.6 | 4.5 | 10.0 | 6.2 |
| (c) Lath and plaster ceiling with ½" rigid deck insulation | 1" | 0.21 | 2.1 | 3.2 | 4.2 | 5.3 | 11.8 | 7.3 |
| | 2" | 0.17 | 1.7 | 2.6 | 3.4 | 4.3 | 9.5 | 6.0 |
| (d) Lath and plaster ceiling with 1" rigid deck insulation | 1" | 0.18 | 1.8 | 2.7 | 3.6 | 4.5 | 10.0 | 6.3 |
| | 2" | 0.15 | 1.5 | 2.2 | 3.0 | 3.7 | 8.4 | 5.3 |
| (e) Same as (a) with 2" blanket or bat insulation between joists | 1" | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 | 6.7 | 4.2 |
| | 2" | 0.10 | 1.0 | 1.5 | 2.0 | 2.5 | 5.6 | 3.5 |
| (f) Same as (a) with 3½" mineral wool or equivalent between joists | 1" or 2" | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 | 5.0 | 3.2 |
| **WOOD FLOORS OVER SPACES THAT ARE ENCLOSED** (Does not include crawl spaces) | | | | | | | | |
| **No. 19** | | | | | | | | |
| (a) Double floor on joists | | 0.34 | 1.7 | 3.4 | 5.1 | 6.8 | | |
| (b) Same as (a) with lath and plaster ceiling | | 0.25 | 1.2 | 2.5 | 3.8 | 5.0 | | |

In selecting solar heat gain factors, roofs that are black or dark green are considered dark, those that are red, brown, or light green are considered as being light.

*Table P-4.⑤ Heat Gain Factors for Cooling Calculations*—Continued

| DESCRIPTION | U | Conduction Heat Gain Fcators (Multiply values shown by exposed areas) Design Temp. Difference °F. | | | |
|---|---|---|---|---|---|
| | | 10 | 15 | 20 | 25 |
| **WOOD FLOORS OVER SPACES EXPOSED TO OUTDOOR TEMPERATURES** | | | | | |
| No. 20 | | | | | |
| (a) Double floor on joists | 0.34 | 3.4 | 5.1 | 6.8 | 8.5 |
| (b) Same as (a) with lath and plaster ceiling | 0.25 | 2.5 | 3.8 | 5.0 | 6.3 |
| (c) Same as (a) with ½" rigid insulation on bottom of joists | 0.19 | 1.9 | 2.8 | 3.8 | 4.7 |
| (d) Same as (a) with sheathing on bottom of joists and 2" bat insulation between joists | 0.12 | 1.2 | 1.8 | 2.4 | 3.0 |
| (e) Same as (a) with sheathing on bottom of joists and 3⅝" mineral wool or equivalent between joists | 0.09 | 0.9 | 1.4 | 1.8 | 2.3 |

*Table P-5. Infiltration Factors*

| DESCRIPTION | C.F.H. Per Foot Crack | INFILTRATION FACTORS (Multiply values shown by running feet crack) Design Temperature Difference °F. | | | |
|---|---|---|---|---|---|
| | | 10 | 15 | 20 | 25 |
| **WINDOWS** | | | | | |
| **No. 21 — Wood Sash Windows** | | | | | |
| Double Hung | | | | | |
| (a) Average fit, not weatherstripped | 39 | 8 | 11 | 14 | 18 |
| (b) Average fit, weatherstripped or double glass | 24 | 5 | 7 | 9 | 11 |
| (c) Poor fit, not weatherstripped | 111 | 20 | 30 | 40 | 50 |
| (d) Poor fit, weatherstripped or double glass | 34 | 6 | 9 | 12 | 15 |
| (e) Wood casement hinged | 111 | 20 | 30 | 40 | 50 |
| (f) Same as (e) weatherstripped or double glass | 55 | 10 | 15 | 20 | 25 |
| **No. 22 — Double-Hung, Metal Windows** | | | | | |
| (g) Not weatherstripped | 72 | 14 | 20 | 26 | 33 |
| (h) Weatherstripped | 32 | 6 | 9 | 12 | 15 |
| Rolled Section, Steel Sash Windows | | | | | |
| (c) Architectural projected (also steel basement sash) | 88 | 16 | 24 | 32 | 40 |
| (d) Residential casement | 52 | 9 | 14 | 19 | 23 |
| **DOORS** | | | | | |
| **No. 23 — Residential Service** | | | | | |
| (a) Well fitted door, not weatherstripped | 111 | 20 | 30 | 40 | 50 |
| (b) Poorly fitted door, not weatherstripped | 222 | 40 | 60 | 80 | 100 |
| (c) Door, weatherstripped | 55 | 10 | 15 | 20 | 25 |

**FOR ANY GIVEN LOCALITY, USE ONLY THE INFILTRATION FACTORS SHOWN IN THE COLUMN OF DESIGN TEMPERATURE DIFFERENCE FOR THAT LOCALITY.**

**INFILTRATION FACTORS** for infiltration gain (Nos. 21 to 23) are in terms of the sensible BTU gain per lineal foot of crackage per hour, and are the product of the air leakage per foot of crack per hour, the density of room air, the specific heat of air, and the appropriate temperature difference.

*Table P-6. Register and Duct Capacities in BTU*

| Rd. Pipe | Rect. Duct | Stack | Register | Length in Feet/Bonnet to Register | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 6" | 4/8 | 10x3¼ | 10/6 | 2740 | 2610 | 2500 | 2380 | 2200 | 2000 | 1880 | 1750 |
| 7" | 5/8 | 12x3¼ | 12/6 | 3500 | 3380 | 3100 | 2980 | 2780 | 2540 | 2300 | 2140 |
| 8" | 6/8 | 14x3¼ | 14/6 | 4600 | 4500 | 4050 | 3760 | 3500 | 3240 | 3000 | 2880 |

Values given in above table are Sensible BTU Heat Gain per hour. Duct sizes are based on an available static pressure external to the furnace and cooling coil of .2" W.C., an average number of fittings and a T.D. of 23°. When excessive fittings are required, use next size larger than shown in Table.