

Appendix F: Flow charts

The charts in this appendix are arranged by fluid type and differential temperatures. The charts are further broken down into columns of flow by the on-center (o.c.) distance of the piping. On the left side of each chart is the BTU/h/ft² column. See **Figure F-1**.

Note: The shaded area on the charts should not be used for residential applications. Never exceed 12 inches on center for residential applications.

Example

Determine the flow per loop for the room.

- The room is 12 foot by 12 foot with the piping installed at 9 inches on center. The load for the room is 40 BTU/h/ft². The room is 15 feet from the manifold location.
- First determine the amount of piping in the room.
12 x 12 = 144 square feet
144 x 1.333 = 192 feet
There is 192 feet of active loop in the room.

- Next determine the amount of leader length from the room to the manifold location. The distance from the room to the manifold location is 15 feet. The distance is doubled to account for the supply and return piping.

15 x 2 = 30 feet
Vertical distance of piping at the manifold = 3 feet
30 + 6 = 36 feet
There is 36 feet of leader length for this loop.

- Total loop length is the active and leader length added together.
192 + 36 = 228 total loop length
- To determine the flow for the loop, select the appropriate chart. In this example, use the 100% water at 10°F differential chart.

- Enter the chart at the BTU/h/ft² for the room (40).
- Move to the right to the 9" o.c. column.
- Where the two lines intersect is the value in gallons per minute (gpm) per foot of piping (0.00608).

- Multiply the active loop length by the value found in line 3 above.

$$192 \times 0.00608 = 1.17 \text{ gpm}$$

- Flow for the loop in the example room is 1.17 gpm.

Note: Flow is based on the active loop length in the room. Head pressure drop is computed from the flow for the loop and the total loop length. Do not use the total loop length to determine the flow for the loop. See **Appendix G** for pressure loss charts.

100% Water | 10° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00507 | 0.00591 | 0.00676 | 0.00760 | 0.00845 | 0.01014 | 0.01267 |
| 49 | 0.00497 | 0.00579 | 0.00662 | 0.00745 | 0.00828 | 0.00993 | 0.01242 |
| 48 | 0.00487 | 0.00568 | 0.00649 | 0.00730 | 0.00811 | 0.00973 | 0.01216 |
| 47 | 0.00476 | 0.00556 | 0.00635 | 0.00715 | 0.00796 | 0.00956 | 0.01190 |
| 46 | 0.00466 | 0.00544 | 0.00622 | 0.00699 | 0.00777 | 0.00932 | 0.01166 |
| 45 | 0.00456 | 0.00532 | 0.00608 | 0.00684 | 0.00760 | 0.00912 | 0.01140 |
| 44 | 0.00446 | 0.00520 | 0.00595 | 0.00669 | 0.00743 | 0.00892 | 0.01115 |
| 43 | 0.00436 | 0.00508 | 0.00581 | 0.00654 | 0.00726 | 0.00872 | 0.01090 |
| 42 | 0.00426 | 0.00497 | 0.00568 | 0.00639 | 0.00709 | 0.00851 | 0.01064 |
| 41 | 0.00416 | 0.00485 | 0.00554 | 0.00623 | 0.00693 | 0.00831 | 0.01039 |
| 40 | 0.00405 | 0.00473 | 0.00541 | 0.00608 | 0.00676 | 0.00811 | 0.01014 |
| 39 | 0.00395 | 0.00461 | 0.00527 | 0.00593 | 0.00659 | 0.00791 | 0.00988 |
| 38 | 0.00385 | 0.00449 | 0.00513 | 0.00578 | 0.00642 | 0.00770 | 0.00963 |
| 37 | 0.00375 | 0.00437 | 0.00500 | 0.00563 | 0.00625 | 0.00750 | 0.00938 |
| 36 | 0.00365 | 0.00426 | 0.00486 | 0.00547 | 0.00608 | 0.00730 | 0.00912 |

Figure F-1: Excerpt from 100% water flow chart

Appendix F: Flow charts

100% Water | 10° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00507 | 0.00591 | 0.00676 | 0.00760 | 0.00845 | 0.01014 | 0.01267 |
| 49 | 0.00497 | 0.00579 | 0.00662 | 0.00745 | 0.00828 | 0.00993 | 0.01242 |
| 48 | 0.00487 | 0.00568 | 0.00649 | 0.00730 | 0.00811 | 0.00973 | 0.01216 |
| 47 | 0.00476 | 0.00556 | 0.00635 | 0.00715 | 0.00796 | 0.00956 | 0.01190 |
| 46 | 0.00466 | 0.00544 | 0.00622 | 0.00699 | 0.00777 | 0.00932 | 0.01166 |
| 45 | 0.00456 | 0.00532 | 0.00608 | 0.00684 | 0.00760 | 0.00912 | 0.01140 |
| 44 | 0.00446 | 0.00520 | 0.00595 | 0.00669 | 0.00743 | 0.00892 | 0.01115 |
| 43 | 0.00436 | 0.00508 | 0.00581 | 0.00654 | 0.00726 | 0.00872 | 0.01090 |
| 42 | 0.00426 | 0.00497 | 0.00568 | 0.00639 | 0.00709 | 0.00851 | 0.01064 |
| 41 | 0.00416 | 0.00485 | 0.00554 | 0.00623 | 0.00693 | 0.00831 | 0.01039 |
| 40 | 0.00405 | 0.00473 | 0.00541 | 0.00608 | 0.00676 | 0.00811 | 0.01014 |
| 39 | 0.00395 | 0.00461 | 0.00527 | 0.00593 | 0.00659 | 0.00791 | 0.00988 |
| 38 | 0.00385 | 0.00449 | 0.00513 | 0.00578 | 0.00642 | 0.00770 | 0.00963 |
| 37 | 0.00375 | 0.00437 | 0.00500 | 0.00563 | 0.00625 | 0.00750 | 0.00938 |
| 36 | 0.00365 | 0.00426 | 0.00486 | 0.00547 | 0.00608 | 0.00730 | 0.00912 |
| 35 | 0.00355 | 0.00414 | 0.00473 | 0.00532 | 0.00591 | 0.00709 | 0.00887 |
| 34 | 0.00345 | 0.00402 | 0.00459 | 0.00517 | 0.00574 | 0.00689 | 0.00862 |
| 33 | 0.00334 | 0.00390 | 0.00446 | 0.00502 | 0.00557 | 0.00669 | 0.00836 |
| 32 | 0.00324 | 0.00378 | 0.00432 | 0.00487 | 0.00541 | 0.00649 | 0.00811 |
| 31 | 0.00314 | 0.00367 | 0.00419 | 0.00471 | 0.00524 | 0.00628 | 0.00786 |
| 30 | 0.00304 | 0.00355 | 0.00405 | 0.00456 | 0.00507 | 0.00608 | 0.00760 |
| 29 | 0.00294 | 0.00343 | 0.00392 | 0.00441 | 0.00490 | 0.00588 | 0.00735 |
| 28 | 0.00284 | 0.00331 | 0.00378 | 0.00426 | 0.00473 | 0.00568 | 0.00709 |
| 27 | 0.00274 | 0.00319 | 0.00365 | 0.00410 | 0.00456 | 0.00547 | 0.00684 |
| 26 | 0.00264 | 0.00307 | 0.00351 | 0.00395 | 0.00439 | 0.00527 | 0.00659 |
| 25 | 0.00253 | 0.00296 | 0.00338 | 0.00380 | 0.00422 | 0.00507 | 0.00633 |
| 24 | 0.00243 | 0.00284 | 0.00324 | 0.00365 | 0.00405 | 0.00487 | 0.00608 |
| 23 | 0.00233 | 0.00272 | 0.00311 | 0.00350 | 0.00389 | 0.00466 | 0.00583 |
| 22 | 0.00223 | 0.00260 | 0.00297 | 0.00334 | 0.00372 | 0.00446 | 0.00557 |
| 21 | 0.00213 | 0.00248 | 0.00284 | 0.00319 | 0.00355 | 0.00426 | 0.00532 |
| 20 | 0.00203 | 0.00236 | 0.00270 | 0.00304 | 0.00338 | 0.00405 | 0.00507 |
| 19 | 0.00193 | 0.00225 | 0.00257 | 0.00289 | 0.00321 | 0.00385 | 0.00481 |
| 18 | 0.00182 | 0.00213 | 0.00243 | 0.00274 | 0.00304 | 0.00365 | 0.00456 |
| 17 | 0.00172 | 0.00201 | 0.00230 | 0.00258 | 0.00287 | 0.00345 | 0.00431 |
| 16 | 0.00162 | 0.00189 | 0.00216 | 0.00243 | 0.00270 | 0.00324 | 0.00405 |
| 15 | 0.00152 | 0.00177 | 0.00203 | 0.00228 | 0.00253 | 0.00304 | 0.00380 |
| 14 | 0.00142 | 0.00166 | 0.00189 | 0.00213 | 0.00236 | 0.00284 | 0.00355 |
| 13 | 0.00132 | 0.00154 | 0.00176 | 0.00198 | 0.00220 | 0.00264 | 0.00329 |
| 12 | 0.00122 | 0.00142 | 0.00162 | 0.00182 | 0.00203 | 0.00243 | 0.00304 |
| 11 | 0.00111 | 0.00130 | 0.00149 | 0.00167 | 0.00186 | 0.00223 | 0.00279 |
| 10 | 0.00101 | 0.00118 | 0.00135 | 0.00152 | 0.00169 | 0.00203 | 0.00253 |
| 9 | 0.00091 | 0.00106 | 0.00122 | 0.00137 | 0.00152 | 0.00182 | 0.00228 |
| 8 | 0.00081 | 0.00095 | 0.00108 | 0.00122 | 0.00135 | 0.00162 | 0.00203 |
| 7 | 0.00071 | 0.00083 | 0.00095 | 0.00106 | 0.00118 | 0.00142 | 0.00177 |
| 6 | 0.00061 | 0.00071 | 0.00081 | 0.00091 | 0.00101 | 0.00122 | 0.00152 |
| 5 | 0.00051 | 0.00059 | 0.00068 | 0.00076 | 0.00084 | 0.00101 | 0.00127 |

Note: Flow is based on 100% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-1

Appendix F: Flow charts

100% Water | 20° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00253 | 0.00296 | 0.00338 | 0.00380 | 0.00422 | 0.00507 | 0.00633 |
| 49 | 0.00248 | 0.00290 | 0.00331 | 0.00372 | 0.00414 | 0.00497 | 0.00621 |
| 48 | 0.00243 | 0.00284 | 0.00324 | 0.00365 | 0.00405 | 0.00487 | 0.00608 |
| 47 | 0.00238 | 0.00278 | 0.00318 | 0.00357 | 0.00397 | 0.00476 | 0.00595 |
| 46 | 0.00233 | 0.00272 | 0.00311 | 0.00350 | 0.00389 | 0.00466 | 0.00583 |
| 45 | 0.00228 | 0.00266 | 0.00304 | 0.00342 | 0.00380 | 0.00456 | 0.00570 |
| 44 | 0.00223 | 0.00260 | 0.00297 | 0.00334 | 0.00372 | 0.00446 | 0.00557 |
| 43 | 0.00218 | 0.00254 | 0.00291 | 0.00327 | 0.00363 | 0.00436 | 0.00545 |
| 42 | 0.00213 | 0.00248 | 0.00284 | 0.00319 | 0.00355 | 0.00426 | 0.00532 |
| 41 | 0.00208 | 0.00242 | 0.00277 | 0.00312 | 0.00346 | 0.00416 | 0.00519 |
| 40 | 0.00203 | 0.00236 | 0.00270 | 0.00304 | 0.00338 | 0.00405 | 0.00507 |
| 39 | 0.00198 | 0.00231 | 0.00263 | 0.00296 | 0.00329 | 0.00395 | 0.00494 |
| 38 | 0.00193 | 0.00225 | 0.00257 | 0.00289 | 0.00321 | 0.00385 | 0.00481 |
| 37 | 0.00188 | 0.00219 | 0.00250 | 0.00281 | 0.00313 | 0.00375 | 0.00469 |
| 36 | 0.00182 | 0.00213 | 0.00243 | 0.00274 | 0.00304 | 0.00365 | 0.00456 |
| 35 | 0.00177 | 0.00207 | 0.00236 | 0.00266 | 0.00296 | 0.00355 | 0.00443 |
| 34 | 0.00172 | 0.00201 | 0.00230 | 0.00258 | 0.00287 | 0.00345 | 0.00431 |
| 33 | 0.00167 | 0.00195 | 0.00223 | 0.00251 | 0.00279 | 0.00334 | 0.00418 |
| 32 | 0.00162 | 0.00189 | 0.00216 | 0.00243 | 0.00270 | 0.00324 | 0.00405 |
| 31 | 0.00157 | 0.00183 | 0.00209 | 0.00236 | 0.00262 | 0.00314 | 0.00393 |
| 30 | 0.00152 | 0.00177 | 0.00203 | 0.00228 | 0.00253 | 0.00304 | 0.00380 |
| 29 | 0.00147 | 0.00171 | 0.00196 | 0.00220 | 0.00245 | 0.00294 | 0.00367 |
| 28 | 0.00142 | 0.00166 | 0.00189 | 0.00213 | 0.00236 | 0.00284 | 0.00355 |
| 27 | 0.00137 | 0.00160 | 0.00182 | 0.00205 | 0.00228 | 0.00274 | 0.00342 |
| 26 | 0.00132 | 0.00154 | 0.00176 | 0.00198 | 0.00220 | 0.00264 | 0.00329 |
| 25 | 0.00127 | 0.00148 | 0.00169 | 0.00190 | 0.00211 | 0.00253 | 0.00317 |
| 24 | 0.00122 | 0.00142 | 0.00162 | 0.00182 | 0.00203 | 0.00243 | 0.00304 |
| 23 | 0.00117 | 0.00136 | 0.00155 | 0.00175 | 0.00194 | 0.00233 | 0.00291 |
| 22 | 0.00111 | 0.00130 | 0.00149 | 0.00167 | 0.00186 | 0.00223 | 0.00279 |
| 21 | 0.00106 | 0.00124 | 0.00142 | 0.00160 | 0.00177 | 0.00213 | 0.00266 |
| 20 | 0.00101 | 0.00118 | 0.00135 | 0.00152 | 0.00169 | 0.00203 | 0.00253 |
| 19 | 0.00096 | 0.00112 | 0.00128 | 0.00144 | 0.00160 | 0.00193 | 0.00241 |
| 18 | 0.00091 | 0.00106 | 0.00122 | 0.00137 | 0.00152 | 0.00182 | 0.00228 |
| 17 | 0.00086 | 0.00101 | 0.00115 | 0.00129 | 0.00144 | 0.00172 | 0.00215 |
| 16 | 0.00081 | 0.00095 | 0.00108 | 0.00122 | 0.00135 | 0.00162 | 0.00203 |
| 15 | 0.00076 | 0.00089 | 0.00101 | 0.00114 | 0.00127 | 0.00152 | 0.00190 |
| 14 | 0.00071 | 0.00083 | 0.00095 | 0.00106 | 0.00118 | 0.00142 | 0.00177 |
| 13 | 0.00066 | 0.00077 | 0.00088 | 0.00099 | 0.00110 | 0.00132 | 0.00165 |
| 12 | 0.00061 | 0.00071 | 0.00081 | 0.00091 | 0.00101 | 0.00122 | 0.00152 |
| 11 | 0.00056 | 0.00065 | 0.00074 | 0.00084 | 0.00093 | 0.00111 | 0.00139 |
| 10 | 0.00051 | 0.00059 | 0.00068 | 0.00076 | 0.00084 | 0.00101 | 0.00127 |
| 9 | 0.00046 | 0.00053 | 0.00061 | 0.00068 | 0.00076 | 0.00091 | 0.00114 |
| 8 | 0.00041 | 0.00047 | 0.00054 | 0.00061 | 0.00068 | 0.00081 | 0.00101 |
| 7 | 0.00035 | 0.00041 | 0.00047 | 0.00053 | 0.00059 | 0.00071 | 0.00089 |
| 6 | 0.00030 | 0.00035 | 0.00041 | 0.00046 | 0.00051 | 0.00061 | 0.00076 |
| 5 | 0.00025 | 0.00030 | 0.00034 | 0.00038 | 0.00042 | 0.00051 | 0.00063 |

Note: Flow is based on 100% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-2

Appendix F: Flow charts

30% Glycol | 10° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00528 | 0.00616 | 0.00704 | 0.00792 | 0.00880 | 0.01056 | 0.01320 |
| 49 | 0.00517 | 0.00603 | 0.00690 | 0.00776 | 0.00862 | 0.01035 | 0.01293 |
| 48 | 0.00507 | 0.00591 | 0.00676 | 0.00760 | 0.00844 | 0.01013 | 0.01267 |
| 47 | 0.00496 | 0.00579 | 0.00661 | 0.00744 | 0.00827 | 0.00992 | 0.01240 |
| 46 | 0.00486 | 0.00566 | 0.00647 | 0.00728 | 0.00809 | 0.00971 | 0.01214 |
| 45 | 0.00475 | 0.00554 | 0.00633 | 0.00713 | 0.00792 | 0.00950 | 0.01188 |
| 44 | 0.00464 | 0.00542 | 0.00619 | 0.00697 | 0.00774 | 0.00929 | 0.01161 |
| 43 | 0.00454 | 0.00530 | 0.00605 | 0.00681 | 0.00757 | 0.00908 | 0.01135 |
| 42 | 0.00443 | 0.00517 | 0.00591 | 0.00665 | 0.00739 | 0.00887 | 0.01108 |
| 41 | 0.00433 | 0.00505 | 0.00577 | 0.00649 | 0.00721 | 0.00866 | 0.01082 |
| 40 | 0.00422 | 0.00493 | 0.00563 | 0.00633 | 0.00704 | 0.00845 | 0.01056 |
| 39 | 0.00412 | 0.00480 | 0.00549 | 0.00618 | 0.00686 | 0.00823 | 0.01029 |
| 38 | 0.00401 | 0.00468 | 0.00535 | 0.00602 | 0.00669 | 0.00802 | 0.01003 |
| 37 | 0.00391 | 0.00456 | 0.00521 | 0.00586 | 0.00651 | 0.00781 | 0.00976 |
| 36 | 0.00380 | 0.00443 | 0.00507 | 0.00570 | 0.00633 | 0.00760 | 0.00950 |
| 35 | 0.00369 | 0.00431 | 0.00493 | 0.00554 | 0.00616 | 0.00739 | 0.00924 |
| 34 | 0.00359 | 0.00419 | 0.00479 | 0.00538 | 0.00598 | 0.00718 | 0.00897 |
| 33 | 0.00348 | 0.00406 | 0.00464 | 0.00523 | 0.00581 | 0.00697 | 0.00871 |
| 32 | 0.00338 | 0.00394 | 0.00450 | 0.00507 | 0.00563 | 0.00676 | 0.00845 |
| 31 | 0.00327 | 0.00382 | 0.00436 | 0.00491 | 0.00545 | 0.00654 | 0.00818 |
| 30 | 0.00317 | 0.00369 | 0.00422 | 0.00475 | 0.00528 | 0.00633 | 0.00792 |
| 29 | 0.00306 | 0.00357 | 0.00408 | 0.00459 | 0.00510 | 0.00612 | 0.00765 |
| 28 | 0.00296 | 0.00345 | 0.00394 | 0.00443 | 0.00493 | 0.00591 | 0.00739 |
| 27 | 0.00285 | 0.00333 | 0.00380 | 0.00428 | 0.00475 | 0.00570 | 0.00713 |
| 26 | 0.00274 | 0.00320 | 0.00366 | 0.00412 | 0.00457 | 0.00549 | 0.00686 |
| 25 | 0.00264 | 0.00308 | 0.00352 | 0.00396 | 0.00440 | 0.00528 | 0.00660 |
| 24 | 0.00253 | 0.00296 | 0.00338 | 0.00380 | 0.00422 | 0.00507 | 0.00633 |
| 23 | 0.00243 | 0.00283 | 0.00324 | 0.00364 | 0.00405 | 0.00486 | 0.00607 |
| 22 | 0.00232 | 0.00271 | 0.00310 | 0.00348 | 0.00387 | 0.00464 | 0.00581 |
| 21 | 0.00222 | 0.00259 | 0.00296 | 0.00333 | 0.00369 | 0.00443 | 0.00554 |
| 20 | 0.00211 | 0.00246 | 0.00281 | 0.00317 | 0.00352 | 0.00422 | 0.00528 |
| 19 | 0.00201 | 0.00234 | 0.00267 | 0.00301 | 0.00334 | 0.00401 | 0.00501 |
| 18 | 0.00190 | 0.00222 | 0.00253 | 0.00285 | 0.00317 | 0.00380 | 0.00475 |
| 17 | 0.00179 | 0.00209 | 0.00239 | 0.00269 | 0.00299 | 0.00359 | 0.00449 |
| 16 | 0.00169 | 0.00197 | 0.00225 | 0.00253 | 0.00281 | 0.00338 | 0.00422 |
| 15 | 0.00158 | 0.00185 | 0.00211 | 0.00238 | 0.00264 | 0.00317 | 0.00396 |
| 14 | 0.00148 | 0.00172 | 0.00197 | 0.00222 | 0.00246 | 0.00296 | 0.00369 |
| 13 | 0.00137 | 0.00160 | 0.00183 | 0.00206 | 0.00229 | 0.00274 | 0.00343 |
| 12 | 0.00127 | 0.00148 | 0.00169 | 0.00190 | 0.00211 | 0.00253 | 0.00317 |
| 11 | 0.00116 | 0.00135 | 0.00155 | 0.00174 | 0.00194 | 0.00232 | 0.00290 |
| 10 | 0.00106 | 0.00123 | 0.00141 | 0.00158 | 0.00176 | 0.00211 | 0.00264 |
| 9 | 0.00095 | 0.00111 | 0.00127 | 0.00143 | 0.00158 | 0.00190 | 0.00238 |
| 8 | 0.00084 | 0.00099 | 0.00113 | 0.00127 | 0.00141 | 0.00169 | 0.00211 |
| 7 | 0.00074 | 0.00086 | 0.00099 | 0.00111 | 0.00123 | 0.00148 | 0.00185 |
| 6 | 0.00063 | 0.00074 | 0.00084 | 0.00095 | 0.00106 | 0.00127 | 0.00158 |
| 5 | 0.00053 | 0.00062 | 0.00070 | 0.00079 | 0.00088 | 0.00106 | 0.00132 |

Note: Flow is based on 30% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-3

Appendix F: Flow charts

30% Glycol | 20° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00264 | 0.00308 | 0.00352 | 0.00396 | 0.00440 | 0.00528 | 0.00660 |
| 49 | 0.00259 | 0.00302 | 0.00345 | 0.00388 | 0.00431 | 0.00517 | 0.00647 |
| 48 | 0.00253 | 0.00296 | 0.00338 | 0.00380 | 0.00422 | 0.00507 | 0.00633 |
| 47 | 0.00248 | 0.00289 | 0.00331 | 0.00372 | 0.00413 | 0.00496 | 0.00620 |
| 46 | 0.00243 | 0.00283 | 0.00324 | 0.00364 | 0.00405 | 0.00486 | 0.00607 |
| 45 | 0.00238 | 0.00277 | 0.00317 | 0.00356 | 0.00396 | 0.00475 | 0.00594 |
| 44 | 0.00232 | 0.00271 | 0.00310 | 0.00348 | 0.00387 | 0.00464 | 0.00581 |
| 43 | 0.00227 | 0.00265 | 0.00303 | 0.00340 | 0.00378 | 0.00454 | 0.00567 |
| 42 | 0.00222 | 0.00259 | 0.00296 | 0.00333 | 0.00369 | 0.00443 | 0.00554 |
| 41 | 0.00216 | 0.00252 | 0.00289 | 0.00325 | 0.00361 | 0.00433 | 0.00541 |
| 40 | 0.00211 | 0.00246 | 0.00281 | 0.00317 | 0.00352 | 0.00422 | 0.00528 |
| 39 | 0.00206 | 0.00240 | 0.00274 | 0.00309 | 0.00343 | 0.00412 | 0.00515 |
| 38 | 0.00201 | 0.00234 | 0.00267 | 0.00301 | 0.00334 | 0.00401 | 0.00501 |
| 37 | 0.00195 | 0.00228 | 0.00260 | 0.00293 | 0.00325 | 0.00391 | 0.00488 |
| 36 | 0.00190 | 0.00222 | 0.00253 | 0.00285 | 0.00317 | 0.00380 | 0.00475 |
| 35 | 0.00185 | 0.00216 | 0.00246 | 0.00277 | 0.00308 | 0.00369 | 0.00462 |
| 34 | 0.00179 | 0.00209 | 0.00239 | 0.00269 | 0.00299 | 0.00359 | 0.00449 |
| 33 | 0.00203 | 0.00232 | 0.00261 | 0.00290 | 0.00348 | 0.00348 | 0.00435 |
| 32 | 0.00169 | 0.00197 | 0.00225 | 0.00253 | 0.00281 | 0.00338 | 0.00422 |
| 31 | 0.00164 | 0.00191 | 0.00218 | 0.00245 | 0.00273 | 0.00327 | 0.00409 |
| 30 | 0.00158 | 0.00185 | 0.00211 | 0.00238 | 0.00264 | 0.00317 | 0.00396 |
| 29 | 0.00153 | 0.00179 | 0.00204 | 0.00230 | 0.00255 | 0.00306 | 0.00383 |
| 28 | 0.00148 | 0.00172 | 0.00197 | 0.00222 | 0.00246 | 0.00296 | 0.00369 |
| 27 | 0.00143 | 0.00166 | 0.00190 | 0.00214 | 0.00238 | 0.00285 | 0.00356 |
| 26 | 0.00137 | 0.00160 | 0.00183 | 0.00206 | 0.00229 | 0.00274 | 0.00343 |
| 25 | 0.00132 | 0.00154 | 0.00176 | 0.00198 | 0.00220 | 0.00264 | 0.00330 |
| 24 | 0.00127 | 0.00148 | 0.00169 | 0.00190 | 0.00211 | 0.00253 | 0.00317 |
| 23 | 0.00121 | 0.00142 | 0.00162 | 0.00182 | 0.00202 | 0.00243 | 0.00303 |
| 22 | 0.00116 | 0.00135 | 0.00155 | 0.00174 | 0.00194 | 0.00232 | 0.00290 |
| 21 | 0.00111 | 0.00129 | 0.00148 | 0.00166 | 0.00185 | 0.00222 | 0.00277 |
| 20 | 0.00106 | 0.00123 | 0.00141 | 0.00158 | 0.00176 | 0.00211 | 0.00264 |
| 19 | 0.00100 | 0.00117 | 0.00134 | 0.00150 | 0.00167 | 0.00201 | 0.00251 |
| 18 | 0.00095 | 0.00111 | 0.00127 | 0.00143 | 0.00158 | 0.00190 | 0.00238 |
| 17 | 0.00090 | 0.00105 | 0.00120 | 0.00135 | 0.00150 | 0.00179 | 0.00224 |
| 16 | 0.00084 | 0.00099 | 0.00113 | 0.00127 | 0.00141 | 0.00169 | 0.00211 |
| 15 | 0.00079 | 0.00092 | 0.00106 | 0.00119 | 0.00132 | 0.00158 | 0.00198 |
| 14 | 0.00074 | 0.00086 | 0.00099 | 0.00111 | 0.00123 | 0.00148 | 0.00185 |
| 13 | 0.00069 | 0.00080 | 0.00091 | 0.00103 | 0.00114 | 0.00137 | 0.00172 |
| 12 | 0.00063 | 0.00074 | 0.00084 | 0.00095 | 0.00106 | 0.00127 | 0.00158 |
| 11 | 0.00058 | 0.00068 | 0.00077 | 0.00087 | 0.00097 | 0.00116 | 0.00145 |
| 10 | 0.00053 | 0.00062 | 0.00070 | 0.00079 | 0.00088 | 0.00106 | 0.00132 |
| 9 | 0.00048 | 0.00055 | 0.00063 | 0.00071 | 0.00079 | 0.00095 | 0.00119 |
| 8 | 0.00042 | 0.00049 | 0.00056 | 0.00063 | 0.00070 | 0.00084 | 0.00106 |
| 7 | 0.00037 | 0.00043 | 0.00049 | 0.00055 | 0.00062 | 0.00074 | 0.00092 |
| 6 | 0.00032 | 0.00037 | 0.00042 | 0.00048 | 0.00053 | 0.00063 | 0.00079 |
| 5 | 0.00026 | 0.00031 | 0.00035 | 0.00040 | 0.00044 | 0.00053 | 0.00066 |

Note: Flow is based on 30% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-4

Appendix F: Flow charts

40% Glycol | 10° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00542 | 0.00632 | 0.00722 | 0.00813 | 0.00903 | 0.01084 | 0.01354 |
| 49 | 0.00531 | 0.00619 | 0.00708 | 0.00796 | 0.00885 | 0.01062 | 0.01327 |
| 48 | 0.00520 | 0.00607 | 0.00693 | 0.00780 | 0.00867 | 0.01040 | 0.01300 |
| 47 | 0.00509 | 0.00594 | 0.00679 | 0.00764 | 0.00849 | 0.01019 | 0.01273 |
| 46 | 0.00498 | 0.00581 | 0.00665 | 0.00748 | 0.00831 | 0.00997 | 0.01246 |
| 45 | 0.00488 | 0.00569 | 0.00650 | 0.00731 | 0.00813 | 0.00975 | 0.01219 |
| 44 | 0.00477 | 0.00556 | 0.00636 | 0.00715 | 0.00795 | 0.00954 | 0.01192 |
| 43 | 0.00466 | 0.00544 | 0.00621 | 0.00699 | 0.00777 | 0.00932 | 0.01165 |
| 42 | 0.00455 | 0.00531 | 0.00607 | 0.00683 | 0.00758 | 0.00910 | 0.01138 |
| 41 | 0.00444 | 0.00518 | 0.00592 | 0.00666 | 0.00740 | 0.00888 | 0.01111 |
| 40 | 0.00433 | 0.00506 | 0.00578 | 0.00650 | 0.00722 | 0.00867 | 0.01084 |
| 39 | 0.00423 | 0.00493 | 0.00563 | 0.00634 | 0.00704 | 0.00845 | 0.01056 |
| 38 | 0.00412 | 0.00480 | 0.00549 | 0.00618 | 0.00686 | 0.00823 | 0.01029 |
| 37 | 0.00401 | 0.00468 | 0.00534 | 0.00601 | 0.00668 | 0.00802 | 0.01002 |
| 36 | 0.00390 | 0.00455 | 0.00520 | 0.00585 | 0.00650 | 0.00780 | 0.00975 |
| 35 | 0.00379 | 0.00442 | 0.00506 | 0.00569 | 0.00632 | 0.00758 | 0.00948 |
| 34 | 0.00368 | 0.00430 | 0.00491 | 0.00553 | 0.00614 | 0.00737 | 0.00921 |
| 33 | 0.00358 | 0.00417 | 0.00477 | 0.00536 | 0.00596 | 0.00715 | 0.00894 |
| 32 | 0.00347 | 0.00404 | 0.00462 | 0.00520 | 0.00578 | 0.00693 | 0.00867 |
| 31 | 0.00336 | 0.00392 | 0.00448 | 0.00504 | 0.00560 | 0.00672 | 0.00840 |
| 30 | 0.00325 | 0.00379 | 0.00433 | 0.00488 | 0.00542 | 0.00650 | 0.00813 |
| 29 | 0.00314 | 0.00367 | 0.00419 | 0.00471 | 0.00524 | 0.00628 | 0.00786 |
| 28 | 0.00303 | 0.00354 | 0.00404 | 0.00455 | 0.00506 | 0.00607 | 0.00758 |
| 27 | 0.00293 | 0.00341 | 0.00390 | 0.00439 | 0.00488 | 0.00585 | 0.00731 |
| 26 | 0.00282 | 0.00329 | 0.00376 | 0.00423 | 0.00470 | 0.00563 | 0.00704 |
| 25 | 0.00271 | 0.00316 | 0.00361 | 0.00406 | 0.00451 | 0.00542 | 0.00677 |
| 24 | 0.00260 | 0.00303 | 0.00347 | 0.00390 | 0.00433 | 0.00520 | 0.00650 |
| 23 | 0.00249 | 0.00291 | 0.00332 | 0.00374 | 0.00415 | 0.00498 | 0.00623 |
| 22 | 0.00238 | 0.00278 | 0.00318 | 0.00358 | 0.00397 | 0.00477 | 0.00596 |
| 21 | 0.00228 | 0.00265 | 0.00303 | 0.00341 | 0.00379 | 0.00455 | 0.00569 |
| 20 | 0.00217 | 0.00253 | 0.00289 | 0.00325 | 0.00361 | 0.00433 | 0.00542 |
| 19 | 0.00206 | 0.00240 | 0.00274 | 0.00309 | 0.00343 | 0.00412 | 0.00515 |
| 18 | 0.00195 | 0.00228 | 0.00260 | 0.00293 | 0.00325 | 0.00390 | 0.00488 |
| 17 | 0.00184 | 0.00215 | 0.00246 | 0.00276 | 0.00307 | 0.00368 | 0.00461 |
| 16 | 0.00173 | 0.00202 | 0.00231 | 0.00260 | 0.00289 | 0.00347 | 0.00433 |
| 15 | 0.00163 | 0.00190 | 0.00217 | 0.00244 | 0.00271 | 0.00325 | 0.00406 |
| 14 | 0.00152 | 0.00177 | 0.00202 | 0.00228 | 0.00253 | 0.00303 | 0.00379 |
| 13 | 0.00141 | 0.00164 | 0.00188 | 0.00211 | 0.00235 | 0.00282 | 0.00352 |
| 12 | 0.00130 | 0.00152 | 0.00173 | 0.00195 | 0.00217 | 0.00260 | 0.00325 |
| 11 | 0.00119 | 0.00139 | 0.00159 | 0.00179 | 0.00199 | 0.00238 | 0.00298 |
| 10 | 0.00108 | 0.00126 | 0.00144 | 0.00163 | 0.00181 | 0.00217 | 0.00271 |
| 9 | 0.00098 | 0.00114 | 0.00130 | 0.00146 | 0.00163 | 0.00195 | 0.00244 |
| 8 | 0.00087 | 0.00101 | 0.00116 | 0.00130 | 0.00144 | 0.00173 | 0.00217 |
| 7 | 0.00076 | 0.00088 | 0.00101 | 0.00114 | 0.00126 | 0.00152 | 0.00190 |
| 6 | 0.00065 | 0.00076 | 0.00087 | 0.00098 | 0.00108 | 0.00130 | 0.00163 |
| 5 | 0.00054 | 0.00063 | 0.00072 | 0.00081 | 0.00090 | 0.00108 | 0.00135 |

Note: Flow is based on 40% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-5

Appendix F: Flow charts

40% Glycol | 20° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00271 | 0.00316 | 0.00361 | 0.00406 | 0.00451 | 0.00542 | 0.00677 |
| 49 | 0.00265 | 0.00310 | 0.00354 | 0.00398 | 0.00442 | 0.00531 | 0.00664 |
| 48 | 0.00260 | 0.00303 | 0.00347 | 0.00390 | 0.00433 | 0.00520 | 0.00650 |
| 47 | 0.00255 | 0.00297 | 0.00339 | 0.00382 | 0.00424 | 0.00509 | 0.00637 |
| 46 | 0.00249 | 0.00291 | 0.00332 | 0.00374 | 0.00415 | 0.00498 | 0.00623 |
| 45 | 0.00244 | 0.00284 | 0.00325 | 0.00366 | 0.00406 | 0.00488 | 0.00609 |
| 44 | 0.00238 | 0.00278 | 0.00318 | 0.00358 | 0.00397 | 0.00477 | 0.00596 |
| 43 | 0.00233 | 0.00272 | 0.00311 | 0.00349 | 0.00388 | 0.00466 | 0.00582 |
| 42 | 0.00228 | 0.00265 | 0.00303 | 0.00341 | 0.00379 | 0.00455 | 0.00569 |
| 41 | 0.00222 | 0.00259 | 0.00296 | 0.00333 | 0.00370 | 0.00444 | 0.00555 |
| 40 | 0.00217 | 0.00253 | 0.00289 | 0.00325 | 0.00361 | 0.00433 | 0.00542 |
| 39 | 0.00211 | 0.00246 | 0.00282 | 0.00317 | 0.00352 | 0.00423 | 0.00528 |
| 38 | 0.00206 | 0.00240 | 0.00274 | 0.00309 | 0.00343 | 0.00412 | 0.00515 |
| 37 | 0.00200 | 0.00234 | 0.00267 | 0.00301 | 0.00334 | 0.00401 | 0.00501 |
| 36 | 0.00195 | 0.00228 | 0.00260 | 0.00293 | 0.00325 | 0.00390 | 0.00488 |
| 35 | 0.00190 | 0.00221 | 0.00253 | 0.00284 | 0.00316 | 0.00379 | 0.00474 |
| 34 | 0.00184 | 0.00215 | 0.00246 | 0.00276 | 0.00307 | 0.00368 | 0.00461 |
| 33 | 0.00179 | 0.00209 | 0.00238 | 0.00268 | 0.00298 | 0.00358 | 0.00447 |
| 32 | 0.00173 | 0.00202 | 0.00231 | 0.00260 | 0.00289 | 0.00347 | 0.00433 |
| 31 | 0.00168 | 0.00196 | 0.00224 | 0.00252 | 0.00280 | 0.00336 | 0.00420 |
| 30 | 0.00163 | 0.00190 | 0.00217 | 0.00244 | 0.00271 | 0.00325 | 0.00406 |
| 29 | 0.00157 | 0.00183 | 0.00209 | 0.00236 | 0.00262 | 0.00314 | 0.00393 |
| 28 | 0.00152 | 0.00177 | 0.00202 | 0.00228 | 0.00253 | 0.00303 | 0.00379 |
| 27 | 0.00146 | 0.00171 | 0.00195 | 0.00219 | 0.00244 | 0.00293 | 0.00366 |
| 26 | 0.00141 | 0.00164 | 0.00188 | 0.00211 | 0.00235 | 0.00282 | 0.00352 |
| 25 | 0.00135 | 0.00158 | 0.00181 | 0.00203 | 0.00226 | 0.00271 | 0.00339 |
| 24 | 0.00130 | 0.00152 | 0.00173 | 0.00195 | 0.00217 | 0.00260 | 0.00325 |
| 23 | 0.00125 | 0.00145 | 0.00166 | 0.00187 | 0.00208 | 0.00249 | 0.00312 |
| 22 | 0.00119 | 0.00139 | 0.00159 | 0.00179 | 0.00199 | 0.00238 | 0.00298 |
| 21 | 0.00114 | 0.00133 | 0.00152 | 0.00171 | 0.00190 | 0.00228 | 0.00284 |
| 20 | 0.00108 | 0.00126 | 0.00144 | 0.00163 | 0.00181 | 0.00217 | 0.00271 |
| 19 | 0.00103 | 0.00120 | 0.00137 | 0.00154 | 0.00172 | 0.00206 | 0.00257 |
| 18 | 0.00098 | 0.00114 | 0.00130 | 0.00146 | 0.00163 | 0.00195 | 0.00244 |
| 17 | 0.00092 | 0.00107 | 0.00123 | 0.00138 | 0.00153 | 0.00184 | 0.00230 |
| 16 | 0.00087 | 0.00101 | 0.00116 | 0.00130 | 0.00144 | 0.00173 | 0.00217 |
| 15 | 0.00081 | 0.00095 | 0.00108 | 0.00122 | 0.00135 | 0.00163 | 0.00203 |
| 14 | 0.00076 | 0.00088 | 0.00101 | 0.00114 | 0.00126 | 0.00152 | 0.00190 |
| 13 | 0.00070 | 0.00082 | 0.00094 | 0.00106 | 0.00117 | 0.00141 | 0.00176 |
| 12 | 0.00065 | 0.00076 | 0.00087 | 0.00098 | 0.00108 | 0.00130 | 0.00163 |
| 11 | 0.00060 | 0.00070 | 0.00079 | 0.00089 | 0.00099 | 0.00119 | 0.00149 |
| 10 | 0.00054 | 0.00063 | 0.00072 | 0.00081 | 0.00090 | 0.00108 | 0.00135 |
| 9 | 0.00049 | 0.00057 | 0.00065 | 0.00073 | 0.00081 | 0.00098 | 0.00122 |
| 8 | 0.00043 | 0.00051 | 0.00058 | 0.00065 | 0.00072 | 0.00087 | 0.00108 |
| 7 | 0.00038 | 0.00044 | 0.00051 | 0.00057 | 0.00063 | 0.00076 | 0.00095 |
| 6 | 0.00033 | 0.00038 | 0.00043 | 0.00049 | 0.00054 | 0.00065 | 0.00081 |
| 5 | 0.00027 | 0.00032 | 0.00036 | 0.00041 | 0.00045 | 0.00054 | 0.00068 |

Note: Flow is based on 40% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-6

Appendix F: Flow charts

50% Glycol | 10° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00568 | 0.00663 | 0.00758 | 0.00852 | 0.00947 | 0.01136 | 0.01421 |
| 49 | 0.00557 | 0.00650 | 0.00742 | 0.00835 | 0.00928 | 0.01114 | 0.01392 |
| 48 | 0.00546 | 0.00636 | 0.00727 | 0.00818 | 0.00909 | 0.01091 | 0.01364 |
| 47 | 0.00534 | 0.00623 | 0.00712 | 0.00801 | 0.00890 | 0.01068 | 0.01335 |
| 46 | 0.00523 | 0.00610 | 0.00697 | 0.00784 | 0.00871 | 0.01046 | 0.01307 |
| 45 | 0.00511 | 0.00597 | 0.00682 | 0.00767 | 0.00852 | 0.01023 | 0.01279 |
| 44 | 0.00500 | 0.00583 | 0.00667 | 0.00750 | 0.00833 | 0.01000 | 0.01250 |
| 43 | 0.00489 | 0.00570 | 0.00652 | 0.00733 | 0.00814 | 0.00977 | 0.01222 |
| 42 | 0.00477 | 0.00557 | 0.00636 | 0.00716 | 0.00796 | 0.00955 | 0.01193 |
| 41 | 0.00466 | 0.00544 | 0.00621 | 0.00699 | 0.00777 | 0.00932 | 0.01165 |
| 40 | 0.00455 | 0.00530 | 0.00606 | 0.00682 | 0.00758 | 0.00909 | 0.01136 |
| 39 | 0.00443 | 0.00517 | 0.00591 | 0.00665 | 0.00739 | 0.00886 | 0.01108 |
| 38 | 0.00432 | 0.00504 | 0.00576 | 0.00648 | 0.00720 | 0.00864 | 0.01080 |
| 37 | 0.00421 | 0.00491 | 0.00561 | 0.00631 | 0.00701 | 0.00841 | 0.01051 |
| 36 | 0.00409 | 0.00477 | 0.00545 | 0.00614 | 0.00682 | 0.00818 | 0.01023 |
| 35 | 0.00398 | 0.00464 | 0.00530 | 0.00597 | 0.00663 | 0.00796 | 0.00994 |
| 34 | 0.00386 | 0.00451 | 0.00515 | 0.00580 | 0.00644 | 0.00773 | 0.00966 |
| 33 | 0.00375 | 0.00438 | 0.00500 | 0.00563 | 0.00625 | 0.00750 | 0.00938 |
| 32 | 0.00364 | 0.00424 | 0.00485 | 0.00546 | 0.00606 | 0.00727 | 0.00909 |
| 31 | 0.00352 | 0.00411 | 0.00470 | 0.00528 | 0.00587 | 0.00705 | 0.00881 |
| 30 | 0.00341 | 0.00398 | 0.00455 | 0.00511 | 0.00568 | 0.00682 | 0.00852 |
| 29 | 0.00330 | 0.00384 | 0.00439 | 0.00494 | 0.00549 | 0.00659 | 0.00824 |
| 28 | 0.00318 | 0.00371 | 0.00424 | 0.00477 | 0.00530 | 0.00636 | 0.00796 |
| 27 | 0.00307 | 0.00358 | 0.00409 | 0.00460 | 0.00511 | 0.00614 | 0.00767 |
| 26 | 0.00295 | 0.00345 | 0.00394 | 0.00443 | 0.00492 | 0.00591 | 0.00739 |
| 25 | 0.00284 | 0.00331 | 0.00379 | 0.00426 | 0.00474 | 0.00568 | 0.00710 |
| 24 | 0.00273 | 0.00318 | 0.00364 | 0.00409 | 0.00455 | 0.00546 | 0.00682 |
| 23 | 0.00261 | 0.00305 | 0.00348 | 0.00392 | 0.00436 | 0.00523 | 0.00653 |
| 22 | 0.00250 | 0.00292 | 0.00333 | 0.00375 | 0.00417 | 0.00500 | 0.00625 |
| 21 | 0.00239 | 0.00278 | 0.00318 | 0.00358 | 0.00398 | 0.00477 | 0.00597 |
| 20 | 0.00227 | 0.00265 | 0.00303 | 0.00341 | 0.00379 | 0.00455 | 0.00568 |
| 19 | 0.00216 | 0.00252 | 0.00288 | 0.00324 | 0.00360 | 0.00432 | 0.00540 |
| 18 | 0.00205 | 0.00239 | 0.00273 | 0.00307 | 0.00341 | 0.00409 | 0.00511 |
| 17 | 0.00193 | 0.00225 | 0.00258 | 0.00290 | 0.00322 | 0.00386 | 0.00483 |
| 16 | 0.00182 | 0.00212 | 0.00242 | 0.00273 | 0.00303 | 0.00364 | 0.00455 |
| 15 | 0.00170 | 0.00199 | 0.00227 | 0.00256 | 0.00284 | 0.00341 | 0.00426 |
| 14 | 0.00159 | 0.00186 | 0.00212 | 0.00239 | 0.00265 | 0.00318 | 0.00398 |
| 13 | 0.00148 | 0.00172 | 0.00197 | 0.00222 | 0.00246 | 0.00295 | 0.00369 |
| 12 | 0.00136 | 0.00159 | 0.00182 | 0.00205 | 0.00227 | 0.00273 | 0.00341 |
| 11 | 0.00125 | 0.00146 | 0.00167 | 0.00188 | 0.00208 | 0.00250 | 0.00313 |
| 10 | 0.00114 | 0.00133 | 0.00152 | 0.00170 | 0.00189 | 0.00227 | 0.00284 |
| 9 | 0.00102 | 0.00119 | 0.00136 | 0.00153 | 0.00170 | 0.00205 | 0.00256 |
| 8 | 0.00091 | 0.00106 | 0.00121 | 0.00136 | 0.00152 | 0.00182 | 0.00227 |
| 7 | 0.00080 | 0.00093 | 0.00106 | 0.00119 | 0.00133 | 0.00159 | 0.00199 |
| 6 | 0.00068 | 0.00080 | 0.00091 | 0.00102 | 0.00114 | 0.00136 | 0.00170 |
| 5 | 0.00057 | 0.00066 | 0.00076 | 0.00085 | 0.00095 | 0.00114 | 0.00142 |

Note: Flow is based on 50% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-7

Appendix F: Flow charts

50% Glycol | 20° Supply/return differential flow in GPM per foot of piping.

| BTU/h/ft ² | Piping on-center distances | | | | | | |
|-----------------------|----------------------------|---------|---------|---------|----------|----------|----------|
| | 6" o.c. | 7" o.c. | 8" o.c. | 9" o.c. | 10" o.c. | 12" o.c. | 15" o.c. |
| 50 | 0.00507 | 0.00591 | 0.00676 | 0.00760 | 0.00845 | 0.01014 | 0.01267 |
| 49 | 0.00497 | 0.00579 | 0.00662 | 0.00745 | 0.00828 | 0.00993 | 0.01242 |
| 48 | 0.00487 | 0.00568 | 0.00649 | 0.00730 | 0.00811 | 0.00973 | 0.01216 |
| 47 | 0.00476 | 0.00556 | 0.00635 | 0.00715 | 0.00794 | 0.00953 | 0.01191 |
| 46 | 0.00466 | 0.00544 | 0.00622 | 0.00699 | 0.00777 | 0.00932 | 0.01166 |
| 45 | 0.00456 | 0.00532 | 0.00608 | 0.00684 | 0.00760 | 0.00912 | 0.01140 |
| 44 | 0.00446 | 0.00520 | 0.00595 | 0.00669 | 0.00743 | 0.00892 | 0.01115 |
| 43 | 0.00436 | 0.00508 | 0.00581 | 0.00654 | 0.00726 | 0.00872 | 0.01090 |
| 42 | 0.00426 | 0.00497 | 0.00568 | 0.00639 | 0.00709 | 0.00851 | 0.01064 |
| 41 | 0.00416 | 0.00485 | 0.00554 | 0.00623 | 0.00693 | 0.00831 | 0.01039 |
| 40 | 0.00405 | 0.00473 | 0.00541 | 0.00608 | 0.00676 | 0.00811 | 0.01014 |
| 39 | 0.00395 | 0.00461 | 0.00527 | 0.00593 | 0.00659 | 0.00791 | 0.00988 |
| 38 | 0.00385 | 0.00449 | 0.00513 | 0.00578 | 0.00642 | 0.00770 | 0.00963 |
| 37 | 0.00375 | 0.00437 | 0.00500 | 0.00563 | 0.00625 | 0.00750 | 0.00938 |
| 36 | 0.00365 | 0.00426 | 0.00486 | 0.00547 | 0.00608 | 0.00730 | 0.00912 |
| 35 | 0.00355 | 0.00414 | 0.00473 | 0.00532 | 0.00591 | 0.00709 | 0.00887 |
| 34 | 0.00345 | 0.00402 | 0.00459 | 0.00517 | 0.00574 | 0.00689 | 0.00862 |
| 33 | 0.00334 | 0.00390 | 0.00446 | 0.00502 | 0.00557 | 0.00669 | 0.00836 |
| 32 | 0.00324 | 0.00378 | 0.00432 | 0.00487 | 0.00541 | 0.00649 | 0.00811 |
| 31 | 0.00314 | 0.00367 | 0.00419 | 0.00471 | 0.00524 | 0.00628 | 0.00786 |
| 30 | 0.00304 | 0.00355 | 0.00405 | 0.00456 | 0.00507 | 0.00608 | 0.00760 |
| 29 | 0.00294 | 0.00343 | 0.00392 | 0.00441 | 0.00490 | 0.00588 | 0.00735 |
| 28 | 0.00284 | 0.00331 | 0.00378 | 0.00426 | 0.00473 | 0.00568 | 0.00709 |
| 27 | 0.00274 | 0.00319 | 0.00365 | 0.00410 | 0.00456 | 0.00547 | 0.00684 |
| 26 | 0.00264 | 0.00307 | 0.00351 | 0.00395 | 0.00439 | 0.00527 | 0.00659 |
| 25 | 0.00253 | 0.00296 | 0.00338 | 0.00380 | 0.00422 | 0.00507 | 0.00633 |
| 24 | 0.00243 | 0.00284 | 0.00324 | 0.00365 | 0.00405 | 0.00487 | 0.00608 |
| 23 | 0.00233 | 0.00272 | 0.00311 | 0.00350 | 0.00389 | 0.00466 | 0.00583 |
| 22 | 0.00223 | 0.00260 | 0.00297 | 0.00334 | 0.00372 | 0.00446 | 0.00557 |
| 21 | 0.00213 | 0.00248 | 0.00284 | 0.00319 | 0.00355 | 0.00426 | 0.00532 |
| 20 | 0.00203 | 0.00236 | 0.00270 | 0.00304 | 0.00338 | 0.00405 | 0.00507 |
| 19 | 0.00193 | 0.00225 | 0.00257 | 0.00289 | 0.00321 | 0.00385 | 0.00481 |
| 18 | 0.00182 | 0.00213 | 0.00243 | 0.00274 | 0.00304 | 0.00365 | 0.00456 |
| 17 | 0.00172 | 0.00201 | 0.00230 | 0.00258 | 0.00287 | 0.00345 | 0.00431 |
| 16 | 0.00162 | 0.00189 | 0.00216 | 0.00243 | 0.00270 | 0.00324 | 0.00405 |
| 15 | 0.00152 | 0.00177 | 0.00203 | 0.00228 | 0.00253 | 0.00304 | 0.00380 |
| 14 | 0.00142 | 0.00166 | 0.00189 | 0.00213 | 0.00236 | 0.00284 | 0.00355 |
| 13 | 0.00132 | 0.00154 | 0.00176 | 0.00198 | 0.00220 | 0.00264 | 0.00329 |
| 12 | 0.00122 | 0.00142 | 0.00162 | 0.00182 | 0.00203 | 0.00243 | 0.00304 |
| 11 | 0.00111 | 0.00130 | 0.00149 | 0.00167 | 0.00186 | 0.00223 | 0.00279 |
| 10 | 0.00101 | 0.00118 | 0.00135 | 0.00152 | 0.00169 | 0.00203 | 0.00253 |
| 9 | 0.00091 | 0.00106 | 0.00122 | 0.00137 | 0.00152 | 0.00182 | 0.00228 |
| 8 | 0.00081 | 0.00095 | 0.00108 | 0.00122 | 0.00135 | 0.00162 | 0.00203 |
| 7 | 0.00071 | 0.00083 | 0.00095 | 0.00106 | 0.00118 | 0.00142 | 0.00177 |
| 6 | 0.00061 | 0.00071 | 0.00081 | 0.00091 | 0.00101 | 0.00122 | 0.00152 |
| 5 | 0.00051 | 0.00059 | 0.00068 | 0.00076 | 0.00084 | 0.00101 | 0.00127 |

Note: Flow is based on 50% water at 120°F. 15" O.C. is NOT FOR USE with residential applications.

Table F-8

