| WIDTH INCHES | DEPTH, IN INCHES 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34 | 77 | 121 | 165 | 210 | 254 | 299 | 344 | 388 | 433 | 478 | 522 |
| | 0.01 | 0.01 | 0.02 | 0.03 | 0.03 | 0.04 | 0.05 | 0.06 | 0.06 | 0.07 | 0.08 | 0.09 |
| 2 | 89 | 217 | 352 | 490 | 629 | 769 | 910 | 1051 | 1192 | 1333 | 1475 | 1616 |
| | 0.01 | 0.04 | 0.06 | 0.08 | 0.10 | 0.13 | 0.15 | 0.18 | 0.20 | 0.22 | 0.25 | 0.27 |
| 3 | 152 | 385 | 639 | 903 | 1172 | 1444 | 1718 | 1992 | 2268 | 2544 | 2821 | 3098 |
| | 0.03 | 0.06 | 0.11 | 0.15 | 0.20 | 0.24 | 0.29 | 0.33 | 0.38 | 0.42 | 0.47 | 0.52 |
| 4 | 217 | 568 | 963 | 1377 | 1802 | 2234 | 2671 | 3110 | 3552 | 3995 | 4440 | 4885 |
| | 0.04 | 0.09 | 0.16 | 0.23 | 0.30 | 0.37 | 0.45 | 0.52 | 0.59 | 0.67 | 0.74 | 0.81 |
| 5 | 284 | 762 | 1311 | 1894 | 2497 | 3113 | 3737 | 4367 | 5002 | 5640 | 6280 | 6922 |
| | 0.05 | 0.13 | 0.22 | 0.32 | 0.42 | 0.52 | 0.62 | 0.73 | 0.83 | 0.94 | 1.05 | 1.15 |
| 6 | 352 | 963 | 1676 | 2443 | 3241 | 4061 | 4894 | 5738 | 6589 | 7445 | 8307 | 9171 |
| | 0.06 | 0.16 | 0.28 | 0.41 | 0.54 | 0.68 | 0.82 | 0.96 | 1.10 | 1.24 | 1.38 | 1.53 |
| 7 | 421 | 1168 | 2054 | 3016 | 4025 | 5064 | 6125 | 7202 | 8290 | 9388 | 10492 | 11602 |
| | 0.07 | 0.19 | 0.34 | 0.50 | 0.67 | 0.84 | 1.02 | 1.20 | 1.38 | 1.56 | 1.75 | 1.93 |
| 8 | 490 | 1377 | 2443 | 3609 | 4840 | 6114 | 7419 | 8746 | 10090 | 11447 | 12815 | 14191 |
| | 0.08 | 0.23 | 0.41 | 0.60 | 0.81 | 1.02 | 1.24 | 1.46 | 1.68 | 1.91 | 2.14 | 2.37 |
| 9 | 559 | 1589 | 2839 | 4218 | 5682 | 7202 | 8765 | 10357 | 11974 | 13608 | 15258 | 16919 |
| | 0.09 | 0.26 | 0.47 | 0.70 | 0.95 | 1.20 | 1.46 | 1.73 | 2.00 | 2.27 | 2.54 | 2.82 |
| 10 | 629 | 1802 | 3241 | 4840 | 6545 | 8323 | 10155 | 12027 | 13931 | 15859 | 17806 | 19770 |
| | 0.10 | 0.30 | 0.54 | 0.81 | 1.09 | 1.39 | 1.69 | 2.00 | 2.32 | 2.64 | 2.97 | 3.29 |
| 11 | 699 | 2018 | 3649 | 5473 | 7426 | 9471 | 11584 | 13748 | 15952 | 18187 | 20448 | 22730 |
| | 0.12 | 0.34 | 0.61 | 0.91 | 1.24 | 1.58 | 1.93 | 2.29 | 2.66 | 3.03 | 3.41 | 3.79 |
| 12 | 769 | 2234 | 4061 | 6114 | 8323 | 10643 | 13046 | 15513 | 18029 | 20586 | 23174 | 25789 |
| | 0.13 | 0.37 | 0.68 | 1.02 | 1.39 | 1.77 | 2.17 | 2.59 | 3.00 | 3.43 | 3.86 | 4.30 |

Table IL-10-1 Roof area (square feet) that can be served by gutters of various dimensions and gutter capacity, in cfs. Assumptions: Slope of gutter is 1/16 inch per foot and Mannings n is 0.012.

| DOWNSPOUT DIAMETER INCHES | GUTTER DEPTH, INCHES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 0.01 | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.03 |
| 2 | 0.02 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.08 | 0.09 | 0.10 | 0.10 |
| 3 | 0.05 | 0.09 | 0.12 | 0.14 | 0.16 | 0.17 | 0.19 | 0.20 | 0.22 | 0.23 |
| 4 | 0.09 | 0.16 | 0.21 | 0.25 | 0.28 | 0.31 | 0.34 | 0.36 | 0.38 | 0.41 |
| 5 | 0.15 | 0.25 | 0.32 | 0.38 | 0.44 | 0.48 | 0.52 | 0.56 | 0.60 | 0.63 |
| 6 | 0.21 | 0.36 | 0.47 | 0.55 | 0.63 | 0.69 | 0.75 | 0.81 | 0.86 | 0.91 |
| 7 | 0.28 | 0.49 | 0.64 | 0.75 | 0.85 | 0.94 | 1.03 | 1.10 | 1.17 | 1.24 |
| 8 | 0.37 | 0.64 | 0.83 | 0.98 | 1.12 | 1.23 | 1.34 | 1.44 | 1.53 | 1.62 |
| 9 | 0.47 | 0.81 | 1.05 | 1.24 | 1.41 | 1.56 | 1.70 | 1.82 | 1.94 | 2.05 |
| 10 | 0.58 | 1.01 | 1.30 | 1.54 | 1.74 | 1.93 | 2.09 | 2.25 | 2.39 | 2.53 |

**Table IL-10-2 Capacity of circular downspouts, in cfs.**

Solve example 10-1 using tables. Assume building is in Illinois.

Step 1. Select a gutter to carry the runoff from a 3000 square foot roof surface (horizontal projection). From Table IL 10-1, find the following:

| Gutter Size | | Gutter Capacity | |
|---|---|---|---|
| Depth (in) | Bottom Width (in) | $Ft^2$ Roof | CFS |
| 6 | 5 | 3113 | .52 |
| 5 | 6 | 3241 | .68 |
| 8 | 4 | 3110 | .52 |

Assume will use a gutter with 6 inch depth and 5 inch bottom width.

Step 2. Compute the number of downspouts required. Use 5 inch downspouts to match bottom width of gutter. From Table IL 10-2, find capacity of a 5 inch downspout with 6 inches gutter depth is 0.48 cfs. Two downspouts are required to carry the flow from a 6 inch deep by 5 inch wide gutter.

Step 3. Maximize design. Assume can slope gutter both directions from the center of the building. Roof area for each gutter, then, is 1500 square feet. From Table IL 10-1, find that a 4" deep by 5" gutter can handle 1894 square feet of roof and can carry 0.32 cfs. From Table IL 10-2, find that a 5" downspout with 4" gutter depth can handle 0.38 cfs. The maximum design is a 4" deep by 5" gutter, sloped both ways from the middle of the building with 5" downspouts on each end.