

Exhibit "A"

This plate applies only when the grate is located in a low point or sump where the water will pond at the grate.

The capacity of the grate depends upon the area of the openings and the depth of water at the grate. Recent experiments have determined that a grate will act as a weir and follow the weir formula for depths (heads) on the grate up to 0.4 ft. It will act as an orifice and follow the orifice formula for heads of 1.4 ft. and over. For heads between 0.4 ft. and 1.4 ft. the operation is indefinite because of vortices and eddies over the grate.

In the usual problem the following are given:

1. A particular design of grate with dimensions.
2. A design discharge (Q) or information as to drainage area, rainfall intensities and runoff coefficients from which a discharge can be estimated.

Procedure:

1. Compute the perimeter of the grate opening (P) ignoring the bars and omitting any side over which the water does not enter, such as when one side is against the face of a curb. Divide the result by 2. This allows for partial clogging of the grate by assuming that only half of the perimeter will be effective.
2. Compute the Q/P ratio.
3. Compute the total area of clear opening (A), excluding area taken up by bars, and divide by 2. This allows for partial clogging of the grate by assuming that only half of the area will be effective.
4. Compute the Q/A ratio.
5. Enter the chart at the bottom scale using line (a) with the Q/P value and line (b) with the Q/A value and read the required head in feet at the left margin.
6. If the required head falls below 0.4 ft., (a) only will apply. This is the usual case.
7. If the required head falls above 1.4 ft., (b) only will apply.
8. If the required head falls between 0.4 ft. and 1.4 ft. the actual head may be anywhere between (a) and (b). Use the value that gives the most conservative result, being sure to use line (a) with Q/P and line (b) with Q/A.
9. If the inlet is a combination type with grate and curb opening the recommended procedure is the same as with a grate alone except the perimeter and area are not divided by 2. The reason for this is that the curb opening will serve as a relief in event the grate becomes clogged. With the grate operating freely it is questionable whether much water will get to the curb opening until the discharge is sufficient to submerge the entire grate.
10. If the grate has an appreciable cross slope so the side away from the curb is higher than that next to the curb the inflow over the side should be determined separately from that over the ends. Use the depth at the middle of the grate for end inflow and depth at edge away from the curb for side inflow.

INLET CAPACITY OF GRATE AT SAG

Plate 2.6-0658