

Computation of the Orifice Coefficient F_B :

Inputs :

Line size = 8.0 "

D

orifice plate size = 4.0 "

d

Computations:

$$B = d / D$$

$$A1 = (0.007 / D)$$

$$A2 = (0.364 + (.076 / (D ^ .5))) * (B ^ 4)$$

$$A3 = 0.4 * ((1.6 - (1 / D)) ^ 5)$$

$$A4 = ((0.07 + (0.5 / D)) - B) ^ (5 / 2)$$

IF A4 < 0 Then A5 = 0

Else A5 = A3 * A4

END IF

$$A6 = ((0.009 + (0.034 / D)))$$

$$A7 = (0.5 - B) ^ (3 / 2)$$

IF A7 < 0 Then A8 = 0

Else A8 = A6 * A7

END IF

$$A9 = ((65 / (D ^ 2) + 3))$$

$$A10 = (B - 0.7) ^ (5 / 2)$$

IF A10 < 0 Then A11 = 0

Else A11 = A9 * A10

END IF

$$K = 0.5993 + A1 + A2 + A5 - A8 + A11$$

$$B2 = (530 / (D ^ 0.5))$$

$$E = d * (830 - (5000 * B) + (9000 * (B^2)) - (4200 * (B^3)) + B2)$$

$$K2 = (K / (1 + ((15 * E) / (1,000,000 * d))))$$

$$F_b = 338.17 * (d ^ 2) * K2 \quad (\text{in cubic feet / hr})$$

$$F_b = 8.11608 * (d ^ 2) * K2 \quad (\text{MCFD})$$