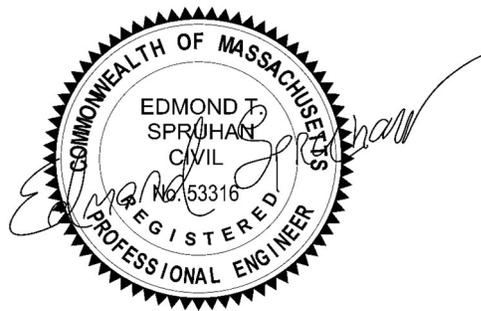


SPRUHAN ENGINEERING, P.C.

PIPE COVER CALCULATIONS

500 SCHOOL STREET, MANSFIELD, MA.



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Modified Iowa Equation

Pipe Deflection is estimated using the Modified Iowa Formula, which takes into account the support provided by the surrounding soil conditions and pipe properties.

$$\text{Deflection}\% = \frac{.1(W' + P)100}{.149PS + .061E'}$$

Where:

W' = Live load (Lbs/In2)

P = Prism Load (Lbs/In2)

PS = Pipe Stiffness (Lbs/In2)

E' = Modulus of Soil Reaction (Lbs/in2)

Deflection Percentage Limits

The PVC pipe industry suggests a maximum vertical ring deflection of 7.5% the original base inside diameter. This includes a 4:1 safety factor to account for manufacturing tolerances, Modified Iowa Equation accuracies, and uncertainties in choosing constants and factors. This maximum threshold value is reflected in ASTM D3034 and ASTM F679.

12" Blue Brute C900 Drainpipe (Used for roof):

$$\text{Deflection}\% = \frac{.1(.83+12.5)100}{.149(129)+.061(1000)} = \underline{\mathbf{1.66\% + 1\% = 2.66\% \pm < 7.5\%}}$$

W' = 12.50 Lbs/In2 = H2O Load for 1ft of cover (Conservative depth of burial)

P = .83 Lbs/In2; Soil Unit weight of 120Lbs/ft3

PS = 129 Lbs/In2; From manufacturer.

E' = 1000 Lbs/in2; For Fine graded Soil with moderate compaction 85% to 95% Proctor (Conservative compaction).

6" PVC Perforated Pipe (Used inside Infiltration System):

$$\text{Deflection}\% = \frac{.1(2.71+5.56)100}{.149(46)+.061(3000)} = \underline{\mathbf{.43 + 1\% = 1.43\% \pm < 7.5\%}}$$

W' = 5.56 Lbs/In2 = H2O Load for 2ft of cover (Conservative depth of burial)

P = 2.71 Lbs/In2; Soil Unit weight of 130Lbs/ft3

PS = 46 Lbs/In2; From manufacturer.

E' = 3000 Lbs/in2; For Crushed Stone with moderate compaction 85% to 95% Proctor (Conservative compaction).