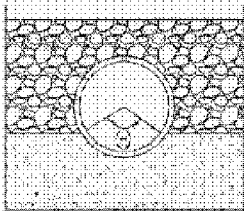


## PVC PIPE DEFLECTION CALCULATIONS

UNDER MOST SOIL CONDITIONS, FLEXIBLE PVC TENDS TO DEFLECT INTO A NEARLY ELLIPTICAL SHAPE AND THE HORIZONTAL AND VERTICAL DEFLECTION MAY BE CONSIDERED EQUAL FOR SMALL DEFLECTIONS. THE EQUATION FOR CALCULATING DEFLECTION IS:

$$\% \frac{\Delta Y}{D} = 100 \left( \frac{D_i * K * P}{0.149 * F / \Delta Y + 0.061 * E'} \right)$$

- $D_i$  = DEFLECTION LAG FACTOR (1.5 OR 1.0 WHEN PRISM LOAD IS ANTICIPATED)  
 $K$  = BEDDING CONSTANT (DEPENDING ON BEDDING ANGLE)



### BEDDING ANGLE $\Theta$

0  
30  
45  
60  
90  
120  
180

### K

0.110  
0.108  
0.105  
0.102  
0.096  
0.090  
0.083

- $F/\Delta Y$  = PIPE STIFFNESS OR OUTSIDE DIAMETER TO THICKNESS RATIO (DR). FOR SDR 35 IT EQUALS 46 PSI (E = 400,000 PSI) AND 56 PSI IF E = 500,000, PSI) WHERE E = THE MODULUS OF ELASTICITY.

- $E'$  = MODULUS OF SOIL REACTION, PSI.

- $P$  = PRISM LOAD (SOIL PRESSURE), PSI.

- LIVELOADS** LIVE LOADS HAVE VERY LITTLE EFFECT ON PIPE PERFORMANCE EXCEPT AT SHALLOW DEPTHS.

THE LIVELOAD ON PVC BURIED 10' OR DEEPER UNDER HIGHWAY (H20) IS NEGLIGIBLE WHERE A H20 LOADING EQUALS A 20 TON TRUCK.

IF THE SEWER IS CROSSING RAILROAD OR AIRPORT, THE LIVE LOAD SHALL BE ACCOUNTED FOR UP TO DEPTH OF 24' AND GREATER.

MAXIMUM DEFLECTION = RECOMMEND A MAXIMUM OF FIVE PERCENT NOT TO EXCEED MANUFACTURER'S MAXIMUM.

- NOTE:** SOURCE OF COMPUTATIONS IS "HANDBOOK OF PVC PIPE DESIGN AND CONSTRUCTION", UNIBELL PVC PIPE ASSOCIATION.