Manning Formula Uniform Pipe Flow at Given Slope and Depth

Angie's Acres

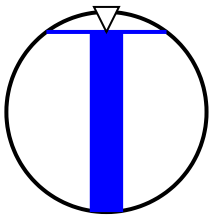
Ditch Capacity

Inputs

Pipe diameter, d_0	2.5	ft
Manning roughness, n	0.011	
Pressure slope (possibly ? equal to pipe slope), S_0	0.03	% rise/run
Percent of (or ratio to) full depth (100% or 1 if flowing full)	90	%

Results

Flow, Q (See notes)	8.9479	cfs
Velocity, v	1.9229	ft/sec
Velocity head, h_v	0.0249	psi
Flow area	4.6534	ft^2
Wetted perimeter	6.2452	ft
Hydraulic radius	0.7451	ft
Top width, T	1.5000	ft
Froude number, F	0.19	
Average shear stress (tractive force), tau	0.0140	psf



Notes:

This is the flow and depth *inside* the pipe.
Getting the flow into the pipe may require significantly higher headwater depth. Add at least 1.5 times the velocity head to get the headwater depth or see my 2-minute tutorial for standard culvert headwater calculations using HY-8.