Sewer and Drain Pipe Size by Manning (Full and Part Full)

Diameter of a circular sewer or drain to carry a flow running full by Manning's equation, and the depth and velocity at the design flow in the size you choose.

Method: Manning's equation for circular conduits; full and part full

Input parameters

Unit system: SI

Parameter	Value	Unit
Design flow	120.00	L/s
Manning roughness	0.013000	
Pipe slope	0.40000	%
Chosen diameter (0 to use the size found)	450.00	mm

Calculated results

Parameter	Value	Unit
Diameter running just full	386.27	mm
Full-bore capacity of the chosen pipe	180.32	L/s
Depth ratio at the design flow	59.630	%
Velocity at the design flow	1.2133	m/s

Notes for this case

- Check the velocity against your standard's self-cleansing minimum and the maximum.

Formula and method

$$D_{full} = \left(\frac{4^{5/3} Q n}{\pi \sqrt{S}} \right)^{3/8}, \quad Q = \frac{1}{n} A R^{2/3} S^{1/2}$$

Variables

Q	Design flow	m³/s
n	Manning roughness	-
S	Pipe slope	-
D_c	Chosen diameter (0 to use the size found)	m
D_{full}	Diameter running just full	m
Q_f	Full-bore capacity of the chosen pipe	m³/s
y/D	Depth ratio at the design flow	-
v	Velocity at the design flow	m/s

Method and standards

Manning.

Assumptions and limits

- Uniform steady flow.
- The calculator does not pick a standard size: enter the next available size above D_full as the chosen diameter to get its capacity, depth and velocity.

References

- Manning's equation for circular conduits
- full and part full

Report details

Report reference	FCC-909J-4Y02 (the same inputs always give the same reference)
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Calculator	Sewer and Drain Pipe Size by Manning (Full and Part Full)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/hydraulics/sewer-pipe-sizing-manning

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.