Common geometric formulas

Parameter	Base relationship	Main input	Control note
Inside diameter	$ID = OD - 2t$	OD, t	OD and t must use the same units and a stated nominal or minimum basis
Metal area	$A = \pi/4 \times (OD^2 - ID^2)$	OD, ID	Area units must be compatible with density and length for mass calculation
Internal flow area	$Ai = \pi/4 \times ID^2$	ID	Deposit, corrosion and tolerance may change effective operating diameter
Internal volume	$V = Ai \times L$	ID, L	Unit conversion must be completed before volume is reported
Theoretical mass	$m = A \times L \times \rho$	OD, ID, L, ρ	Density must match the material family and the result remains theoretical

Source / basis: https://niktrd.com/pipe-calculation