Area of Square or Rectangle

$$\text{Area} = \text{length} \times \text{width} \quad \text{or:} \quad \text{Area} = \text{width} \times \text{thickness}$$

Area or Circle

$$\text{Area} = \pi \times \text{radius}^2 \quad \text{or:} \quad \text{Area} = \pi \times \frac{\text{diameter}^2}{4} \quad \text{or:} \quad \text{Area} = 0.7854 \times \text{diameter}^2$$

Percent Elongation

$$\% \text{ Elongation} = \frac{\text{Final Gage Length} - \text{Original Gage Length}}{\text{Original Gage Length}} \times 100$$

Percent Reduction of Area

$$\% \text{ Reduction of Area} = \frac{\text{Original Area} - \text{Final Area}}{\text{Original Area}} \times 100$$

Tensile Strength

General

$$\text{UTS} = \frac{P \text{ max}}{\text{Area}}$$

where: P max = load to break specimen
Area = specimen's original cross-sectional area

Pipe

$$\text{UTS for full section pipe} = \frac{P \text{ max}}{0.7854\,(OD^2 - ID^2)}$$

Yield Strength

$$\text{YS} = \frac{\text{Load at specified offset}}{\text{Original cross-sectional area}}$$

Welding Heat Input

$$\text{J/in.} = \frac{V \times A \times 60}{\text{Travel Speed (ipm)}}$$

where: J = Joules (energy)
V = welding voltage
A = welding amperage
ipm = inches per minute

Carbon Equivalent

$$CE = \%C + \frac{\%Mn}{6} + \frac{\%Ni}{15} + \frac{\%Cu}{13} + \frac{\%Mo}{14}$$