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

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

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

Pipe

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

Yield Strength

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

Welding Heat Input

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

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

Carbon Equivalent

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

Welding Usage Conversion Chart—U.S. Customary and SI

Property*	To Convert From:	To:	Multiply By:
area dimensions	$in.^2$	mm^2	6.452×10^{2}
	mm^2	$in.^2$	1.550×10^{-3}
current density	$A/in.^2$	A/mm^2	1.550×10^{-3}
	A/mm^2	$A/in.^2$	6.452×10^{2}
deposition rate	lb/hr	kg/hr	0.454
	kg/hr	lb/hr	2.205
flow rate	ft^3/h	l/min	4.719×10^{-1}
	l/min	ft^3/h	2.119
heat input	J/in.	J/m	39.37
	J/m	J/in.	2.54×10^{-2}
linear measure	in.	mm	25.4
	mm	in.	3.937×10^{-2}
	ft	mm	3.048×10^{2}
	mm	ft	3.281×10^{-3}
mass	lb	kg	0.454
	kg	lb	2.205
pressure	psi	kPa	6.895
	psi	MPa	6.895×10^{-3}
	kPa	psi	0.145
	MPa	psi	1.450×10^{2}
	bar	psi	14.50
	psi	bar	6.9×10^{-2}
temperature	°F	°C	(°F – 32) / 1.8
	°C	°F	(°C x 1.8) + 32
tensile strength	psi	MPa	6.895×10^{-3}
	MPa	psi	1.450×10^{2}
travel speed	in./min	mm/s	4.233×10^{-1}
	mm/s	in./min	2.362
vacuum	Pa	torr	7.501×10^{-3}
wire feed speed	in./min	mm/s	0.423
	mm/s	in./min	2.362

Exponential Expression	Multiplication Factor	Prefix	Symbol
10^{6}	1,000,000	mega	M
10^{3}	1,000	kilo	k
10^{-1}	0.1	deci	d
10^{-2}	0.01	centi	c
10^{-3}	0.001	milli	m
10^{-6}	0.000001	micro	m

$10^0 = 1$ (by definition, any number raised to a zero power = 1)

$10^1 = 10$

$10^2 = 100$

$10^3 = 1{,}000$

$10^4 = 10{,}000$
$10^5 = 100{,}000$
$10^6 = 1{,}000{,}000$

$10^{-1} = 0.1$

$10^{-2} = 0.01$

$10^{-3} = 0.001$

$10^{-4} = 0.0001$

$10^{-5} = 0.00001$

$10^{-6} = 0.000001$