

## Quantities You Should Commit To Memory

You should know the conversion between psi and Pa cold.

You should know the elastic moduli of steel and aluminum. (These do vary by up to, say, 5% from one alloy to another).

You should know the magnitude of Poisson ratio for most materials.

The moduli for plastics and yield strengths of most materials vary considerably from one specific material to another (one steel alloy to another). You should have in mind a rough idea of their magnitudes.

### 1. Conversion of units

Rough conversion back and forth: 1 psi ~ 7000 Pa or 1 ksi ~ 7 MPa

### 2. Elastic moduli (E)

Steel:  $30 \times 10^6$  psi or 200 GPa =  $200 \times 10^9$  Pa

Aluminum:  $10 \times 10^6$  psi or 70 GPa =  $70 \times 10^9$  Pa

Plastics: 100,000 to 700,000 psi or 1 to 5 GPa

### 3. Poisson Ratio (?)

While you may end up learning more accurate values appropriate to individual materials, you should at least know that it is approximately 0.3 for most materials.

### 4. Yield Strength

Steel: 36 ksi to 250 ksi or higher; 200 MPa to 1700 MPa or higher

Aluminum Alloys are similar to steel at low end, but do not get nearly so high (not above 100 ksi or 700 MPa)

Plastics: 3 ksi to 15 ksi; 20 MPa to 100 MPa