Below are the properties that are used in the calculations for each of our products.

Section Properties (parameters)

D = outside diameter (or length of long side) in inches
D' = outside length (short side) in inches
t = wall thickness in inches
d = inside diameter (or inside length of long side) in inches (d = D- 2t)
d' = Inside length (short side) in inches (d' = D'- 2t)
PI = Constant (3.14159)
WS = Weight/Foot of Steel (489.8 Lbs/Ft)

Calculation of Properties for Round Tube

Area (in^2) = $\pi/4$ x ($D^2 - d^2$)
Moment of Inertia (in^4)= $\pi/64$ x ($D^4 - d^4$)
Section Modulus(in^4)= $\pi/32$ x [($D^4 - d^4$) / D]
Radius of Gyration(in)= (Moment of Inertia / Area)$^{1/2}$
Weight (lbs/ft) = WS x Area / 144

Calculation of Properties for Square Tube

Area (in^2) = ($D^2 - d^2$)
Moment of Inertia (in^4) = ($D^4 - d^4$) / 12
Section Modulus(in^4) = ($D^4 - d^4$) / 6D
Radius of Gyration (in) = (Moment of Inertia / Area)$^{1/2}$
Weight (lbs/ft) = WS x Area / 144

Note: These section properties are calculated exclusive of the corner radii.

Calculation of Properties for Rectangular Tube

Area (in^2) = (DD' – dd')
Moment of Inertia $_{major}$ (in^4)= (D^3 D'- d^3 d') / 12
Section Modulus $_{major}$ (in^4)= 2 x (Moment of Inertia $_{major}$) / D
Radius of Gyration $_{major}$ (in)= (Moment of Inertia $_{major}$ / Area)$^{1/2}$
Weight (lbs/ft) = WS x Area / 144

Note: These section properties are calculated with respect to the major axis only and are exclusive of the corner radii.

Calculation of Properties for Flat Sided Oval Tube

Area (in^2)= 0.7854 ($D'^2 - d'^2$) + [(D – D') (D' – d')]
Moment of Inertia $_{major}$ (in^4) = 0.7854 (.25D^2) (.5D + 1.5D') t
Section Modulus $_{major}$ (in^4) = 2 x (Moment of Inertia $_{major}$) / D
Radius of Gyration $_{major}$ (in) = (Moment of Inertia $_{major}$ / Area)$^{1/2}$
Weight (lbs/ft) = WS x Area / 144

Note: These section properties are calculated with respect to the major axis only.