Weight Table Calculation:

Weight of Tube:

$W = 10.79\ (OD-T)\ T$

Weight Factor:

$WF = \text{Density} \times 12 \times 3.14159$

Weight per Foot:

$W / ft = (OD - T) \times T \times WF$

Final Length of Tube:

$L_f = [(L_i \times W_i/ft) / W_f/ft] \times (Y_x)$

Variables:

W = Weight (lbs)
WF = Weight Factor
W_i = starting weight
W_f = final weight
OD = Outer Diameter (in.)
T = Wall Thickness (in.)
L_i = starting length
L_f = final length
Y_x = Yield Percentage

Burst Pressure Calculations:

* Values based on the Boardman formula used by some codes:
  P = 2xSxW/(OD-2xFxW) where:
  S = stress in wall F = 0.4 for W/OD < 1/6
  OD = outside dian F = ID/(ID+OD) for W/OD > 1/6
  W = wall thickness
* Stress values are taken from various codes.
* Use for estimates only; use applicable code values for design.

Other Standard Pressure Equations:

Swedish Standard (RN78) Pressure Equation

The internal pressures are calculated by using the following formula:

$$\mathbf{P = (20_S_t_{min})/(OD_m\text{-}t_{min})}$$

Where:

P Internal pressure (bar)
t_{min} Min wall thickness (mm)
S Allowable stress ($S = R_{p0.2}/1.5$) (MPa)
OD Nominal outside diameter (mm)
ID Inside diameter ($OD\text{-}2_t_{min}$) (mm)
m Coefficient depending on the quota OD/ID
m = 1 for OD/ID <= 1.6
m = 0.25_OD/ID+0.6 for 1.6 < OD/ID <= 2.0

American Standard Pressure Equation

The internal pressures are calculated by using the following formula:

$$\mathbf{P = (2_t_{min}_S)/(OD\text{-}(2_Y_t_{min}))}$$

Where:

P Internal pressure (ksi)
t_{min} Min wall thickness (mm)
S Allowable stress (ksi)
OD Nominal outside diameter (mm)
Y 0.4 for t_{min} < OD/6
Y $(OD\text{-}(2_t_{min}))/2(OD\text{-}t_{min})$ for t_{min} = OD/6

Conversion Factors Used

1 inch = 25.4 millimeters
1 foot = 0.3048 meters
1 millimeter = 0.039370079 inches
1 meter = 3.280 839 895 feet

1 lb, lbs = 0.453 592 37 kilogram
1 pound/square inch [absolute] = 6.894 757 28 kilopascal
1 bar = 100000 pascals
F = 32 + 1.78C

Commonly used size conversions

Outer Diameter

inches	0.125	0.156	0.188	0.236	0.25	0.315	0.375	0.394	0.472	0.5	0.75
millimeters	3.175	4.000	4.775	6	6.35	8	9.5	10	12	12.7	19

Wall Thickness

inches	0.02	0.028	0.035	0.039	0.049	0.059	0.065
millimeters	0.5	0.7	0.9	1	1.25	1.5	1.65

PREN - Pitting Resistant Equivalent Number

PREN = %Cr + 3.3 (%Mo + 0.5 * %W) + 16 * %N

%CR = Percentage Chromium
%Mo = Percentage Molybdenum
%W = Percentage Tungsten
%N = Percentage Nitrogen