

Hoop stress calculations in
plastic tubing and pipe

Hoop stress in plastic tubing and pipe may be
calculated by the ISO Equation:

$$S = \frac{P(D - t)}{2t} \quad \text{or} \quad S = \frac{P(R - 1)}{2}$$

S = Stress in circumferential direction, psi

P = Internal pressure, psig

D = Average outside diameter, inches

t = Minimum wall thickness, inches

$$R = \frac{D}{t} = \text{SDR} = \text{Standard thermoplastic demension ratio}$$

Various plastic tubing and pipe dimensional
information can be found in the following
standards or may be obtained from pipe
manufacturers.

ASTM D1785 Polyvinyl Chloride
(PVC) Plastic Pipe,
Schedules 40, 80, and 120

ASTM D2241 Polyvinyl Chloride
(PVC) Plastic Pipe
(SDR-PR)

ASTM D2104 Polyethylene (PE)
Plastic Pipe Schedule 40

ASTM D2239 Polyethylene (PE)
Plastic Pipe (SDR-PR)

ASTM D2447 Polyethylene (PE)
Plastic Pipe, Schedules 40
and 80 Based on Outside
Diameter

ASTM D2666 Polyethylene (PB)
Plastic Tubing

ASTM D2737 Polyethylene (PE)
Plastic Tubing

ASTM D2740 Polyvinyl Chloride
(PVC) Plastic Tubing

ASTM D3035 Polyethylene (PE)
Plastic Pipe (SDR-PR)
Based on Controlled
Outside Diameter

AWWA C900 Polyvinyl Chloride
(PVC) Pressure Pipe,
4" through 12" for Water

AWWA C901 Polyethylene (PE)
Pressure Pipe, Tubing,
and Fittings, 1/2" though
3" for Water