When \( t \) is known and \( P \) is desired

\[
P = SE\left(\frac{Z - 1}{Z + 1}\right)
\]

where

\[
Z = \left(\frac{R + t}{R}\right)^2 = \left(\frac{R_o}{R}\right)^2 = \left(\frac{R_o}{R_o - t}\right)^2
\]

(2) Longitudinal Stress (Circumferential Joints). When the thickness of the cylindrical shell under internal pressure exceeds one-half of the inside radius or when \( P \) exceeds \( 1.25SE \), the following equations shall apply. When \( P \) is known and \( t \) is desired

\[
t = R\left(\gamma^{1/3} - 1\right) = R_o\left(\frac{\gamma^{1/3} - 1}{\gamma^{1/3}}\right)
\]

where

\[
\gamma = \frac{2(SE + P)}{2SE - P}
\]

When \( t \) is known and \( P \) is desired

\[
P = 2SE\left(\frac{Y - 1}{Y + 2}\right)
\]

where

\[
Y = \left(\frac{R + t}{R}\right)^3 = \left(\frac{R_o}{R_o - t}\right)^3
\]

ND-3324.5 Formed Heads, General Requirements. (19)

Formed heads shall meet the requirements of (a) through (i) below.

(a) All formed heads, thicker than the shell and concave to pressure, for butt-welded attachment, shall have a skirt length sufficient to meet the requirements of Figure ND-3358.1(a)-1 when a tapered transition is required.

(b) Any taper at a welded joint within a formed head shall be in accordance with ND-3361. The taper at a circumferential welded joint connecting a formed head to a main shell shall meet the requirements of ND-3358 for the respective type of joint shown therein.

(c) All formed heads concave to pressure and for butt-welded attachment need not have an integral skirt when the thickness of the head is equal to or less than the thickness of the shell. When a skirt is provided, its thickness shall be at least that required for a seamless shell of the same diameter.

(d) The inside crown radius to which an unstayed head is dished shall be not greater than the outside diameter of the skirt of the head. The inside knuckle radius of a torispherical head shall be not less than 6% of the outside diameter of the skirt of the head but in no case less than three times the head thickness.

(e) If a torispherical, ellipsoidal, or hemispherical head is formed with a flattened spot or surface, the diameter of the flat spot shall not exceed that permitted for flat heads as given by eq. ND-3325.2(b)(4) or eq. ND-3325.2(b)(5) using \( C = 0.25 \).

(f) Openings in formed heads under internal pressure shall comply with the requirements of ND-3330.

(g) When an ellipsoidal, torispherical, hemispherical, conical, or toriconical head is of a lesser thickness than required by the rules of ND-3324.5, it shall be stayed as a flat surface according to the rules of ND-3329.

(h) A dished head with a reversed skirt may be used in a component, provided the maximum allowable pressure for the head is established in accordance with the requirements of ND-6900.