The vessel wall thickness shall satisfy the requirements of NB-3200. In the general membrane regions of cylindrical and spherical shells (not local regions as defined in Section III Appendices, Mandatory Appendix XIII, XIII-3120), the wall thickness shall not be less than that obtained from the applicable equations in NB-3324.1 and NB-3324.2, in which:

\[ P = \text{Design Pressure} \]
\[ R = \text{inside radius of shell or head} \]
\[ R_o = \text{outside radius of shell or head} \]
\[ S_n = \text{design stress intensity values (Section II, Part D, Subpart 1, Tables 2A and 2B)} \]
\[ t = \text{thickness of shell or head} \]

**NB-3324.1 Cylindrical Shells.**

\[ t = \frac{PR}{S_m - 0.5P} \quad \text{or} \quad t = \frac{PR_o}{S_m + 0.5P} \]

**NB-3324.2 Spherical Shells.**

\[ t = \frac{PR}{2S_m - P} \quad \text{or} \quad t = \frac{PR_o}{2S_m} \]

**NB-3325 Perforated Flat Plates and Tubesheets.**

Guidelines for calculating stresses in perforated flat plates and tubesheets are provided in Section III Appendices, Nonmandatory Appendix A, Article A-8000.

**NB-3330 OPENINGS AND REINFORCEMENT**

(a) For vessels or parts thereof which meet the requirements of Section III Appendices, Mandatory Appendix XIII, XIII-3510, analysis showing satisfaction of the requirements of Section III Appendices, Mandatory Appendix XIII, XIII-3100 and XIII-3400 in the immediate vicinity of the openings is not required for pressure loading if the rules of NB-3330 are met.

(b) For vessels or parts thereof that do not meet the requirements of Section III Appendices, Mandatory Appendix XIII, XIII-3510 so that a fatigue analysis is required.