**Section 2120.500 Existing Installation of Pressure Vessels**

Maximum Allowable Working Pressure for Standard Pressure Vessels. The maximum allowable working pressure for standard pressure vessels shall be determined in accordance with the applicable provisions of the ASME Code under which they were constructed and stamped.

a) Maximum Allowable Working Pressure for Nonstandard Pressure Vessels.

1) For Internal Pressure. The maximum allowable working pressure on the shell of a nonstandard pressure vessel shall be determined by the strength of the weakest course computed from the thickness of the plate, the tensile strength of the plate, the efficiency of the longitudinal joint, the inside diameter of the course and the factor of safety set by this Part.





Where:

TS = ultimate tensile strength of shell plates, psi. When the tensile strength of steel plate is not known, it shall be taken as 55,000 psi for temperature not exceeding 650F.

t = minimum thickness of shell plate of weakest course, inches.

E = efficiency of longitudinal joint, depending upon construction. Use the following values:

For Fusion-Welded and Brazed Joints:

Single lap welded 40

Double lap welded 60

Single butt welded 60

Double butt welded 75

Forge welded 70

Brazed steel 80

For riveted joints − calculate riveted joint efficiency in accordance with rules given in Section I, Part PR, of the 1971 Edition ASME Code.

R = inside radius for weakest course of shell, inches, provided the thickness does not exceed 10 percent of the radius. If the thickness if over 10 percent of the radius, the outer radius shall be used.

FS = factor of safety permitted shall be a minimum of 5.0.

2) For External Pressure. The maximum allowable working pressure for cylindrical nonstandard pressure vessels subjected to external or collapsing pressure shall be determined by the Rules in Par. UG-27 and UG-28 of Section VIII of the ASME Code.

3) Factors of Safety. The minimum factor of safety may be increased when deemed necessary by the Inspector to assure the operation of the vessel within safe limits. The condition of the vessel and the particular service to which it is subject will be determining factors.

4) End Closures. The maximum allowable working pressure permitted for formed heads under pressure shall be determined by using the appropriate formulas from Par. UG-32, UG-33, or UG-35 of Section VIII, ASME Code and the tensile strength and factors of safety given above.

b) Repairs and Renewals of Fittings and Appurtenances. Whenever repairs are made to fittings and appurtenances or it becomes necessary to replace them, the work must comply with the requirements for new installations.

c) Conditions Not Covered by This Part. All cases not specifically covered by this Part shall be treated as new installations. Existing standard and non-standard pressure vessels shall be governed by current ASME/National Board Inspection Code requirements or the requirement of the ASME Codes in effect at the time of construction. Questions concerning existing non-standard pressure vessels may be referred to the Chief Inspector. Appeal of a decision of the Chief Inspector may be made to the Board.

(Source: Amended at 19 Ill. Reg. 11904, effective August 15, 1995)