

# [Solidworks finite element analyis reports example](https://assignbuster.com/solidworks-finite-element-analyis-reports-example/)

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(e) Estimate the average pressure loading on the pressure vessel and use the standard equations for thin-walled pressure vessels to make an estimate by hand calculation of the pressure vessel wall thickness required to give a Factor of Safety of not less than 2 using whichever of the two failure criteria gives the safer result.

## Conclusion

- The weight is calculated with accuracy of -0. 22(%) for the empty vessel.   
- The weight is calculated with accuracy of -0. 05(%) for the filled vessel.   
- The calculated stress is verified by its comparison with hand calculated membrane stress.   
- Von Mises and Tresca criteria are applied to upper and lower spherical part of the pressure vessel, with FOS larger than 2.   
- Von Mises and Tresca criteria are applied to the cylindrical part of the pressure vessel, using an average Mises stress, with FOS smaller than 2.   
- Von Mises and Tresca criteria are applied to lower spherical part of the pressure vessel, with FOS larger than 2.   
- After the verification of stress level at the cylindrical part of the pressure vessel, with Von Mises criterion, the required thickness is calculated as 0. 042(m).   
- If this pressure vessel were made with a spherical shape, FOS might have been larger than 2 as a whole.   
- The wall of a pressurized spherical vessel is subjected to uniform tensile stresses in all directions.   
- When a cylindrical pressure vessel is to designed, care must be taken especially failure strength of a cylindrical part.   
- The longitudinal welding might better be replaced by a helical welding.

## References

[1] unit 3 riveted joints-IGNOU,   
[online] Available at:   
[Accessed 21 Dec 2013 ].   
[2] Timoshenko and Woinowsky-Krieger, 1959: Theory of Plates and Shells,   
[online] Available at:   
[Accessed 21 Dec 2013 ].   
[3] Introduction to ASME Codes and Standards,   
[online] Available at:   
  
[Accessed 21 Dec 2013 ].   
[4] Spherical Pressure Vessels,   
[online] Available at:   
[Accessed 21 Dec 2013 ].   
[5] Brittle and Ductile Behavior,   
[online] Available at:   
[Accessed 21 Dec 2013 ].   
[6] von Mises yield criterion,   
[online] Available at:   
[Accessed 21 Dec 2013 ].   
[7] Maximum Shear Stress Criterion,   
[online] Available at:   
[Accessed 21 Dec 2013 ].