PROBLEM S4-1 QUESTION

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A stainless steel spherical vessel of dimensions shown in Fig. 3 is subjected to an external pressure of 0.5 MPa and an internal pressure, p_i.

QUESTIONS

Assume failure is to be evaluated by the maximum shear stress theory (i.e., Tresca theory) with a yield stress of 690 MPa.

1) What is the maximum internal pressure that will not fail the vessel? Other stainless steel properties are given below.
2) What is the radial displacement corresponding to the maximum internal pressure?

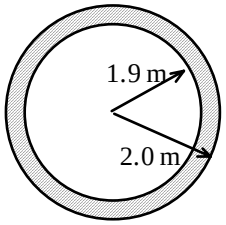

Figure 3. (not to scale)

Stainless Steel

Modulus of elasticity, E	200 GPa
Poisson's ratio, γ	0.3
Density, ρ	7,750 kg/m^3
Coefficient of linear expansion, α	1.6x10^{-5}/°C