Experiment 04  

**Design and Drawing of Hemispherical Head**

**Aim**

- To find the thickness of a sheet metal required for fabrication of Hemispherical Head.
- To draw the same head/or enclosure for calculated dimensions.

**Problem Statement**

Determine the thickness of the hemispherical head (or cover/enclosure) for the process vessel given in experiment 1 by considering the following data:

1. Outer Diameter of the vessel, \( D_o = 1200 \) mm; Design Pressure, \( p = 525 \) kPa; Allowable design stress, \( f = 118 \) MPa; Joint efficiency factor, \( J = 0.85 \)
2. Take Inner Radius, \( IR = \frac{D}{2} = \frac{1995}{2} = 998 \) mm; Straight flange, \( S_f = 5 \) mm;

**Formula Used**

Formulae used to find the thickness of the sheet to fabricate the vessel is

\[
t = \frac{(p \times R)}{(2 \times f \times J) - (0.2 \times p)}
\]

**Solution**

Substituting all the available data as aforementioned you get,

\[
t = 3 \text{ mm}
\]

This is the minimum thickness theoretically calculated, to this 2 mm corrosion allowance is to be added and another 6% is added to take care of the reduction in thickness at the torus section. This gives a practically required minimum thickness of thickness, \( t = 5 \) mm

**Drawing**

For drawing the head or enclosure take a suitable scale ratio
Result

Using the standard equations as given above, we found the thickness of the sheet metal required to fabricate the head is $t = 5$ mm. The drawing for the fabrication was also prepared as shown above.