

PROBLEM SET 3 - HANDOUT

Problem 12-14

A spherical carbon-steel tank with an inside diameter of 9 m will be subjected to a working absolute pressure of 310 kPa and a temperature of 27 °C. All of the welds on the tank are butt-welded with a backing strip. Assuming no corrosion allowance is required, what is the required wall thickness of the tank? Estimate the cost of steel for this tank if the cost of steel sheet is \$1.10 per kilogram. On the bases of the data in Figure 12-52, determine the fraction of the purchased cost of the tank that is due to the cost for the steel.

Problem 12-15

Air at 15 °C and 275 kPa is admitted to the entrance of a horizontal steel pipe with an inside diameter of 0.0779 m. The entering velocity is 15 m/s. Spherical particles with a 60-mesh average particle size are picked up by the airstream immediately downstream from the entrance to the pipe; the weight ratio of solid particles to the air is 4:1, and the density of the particles is 2690 kg/m³. If the pipe is 50 m in length, what is the pressure loss in the pipe?

Cadets are to submit a completed pneumatic conveyor design tool spreadsheet.