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**HOMEWORK PROBLEM: Lesson 13**

Adapted from Moran, Shapiro, Boettner, & Bailey, *Fundamentals of Engineering Thermodynamics*, 8<sup>th</sup> Ed.

13-1 A throttling process is designed to greatly reduce pressure over a small distance in the direction of flow. Throttling valves have no moving parts, you don't plug them in, and their surface areas are too small for there to be any heat transfer.



**A throttling valve**

Water vapor enters such a valve with a mass flow rate of 2 kg/s at a temperature of 320°C and a pressure of 60 bar, throttling to a pressure of 40 bar at the exit. Determine the flow exergy rates at the valve inlet and exit and the rate of exergy destruction, each in kW.