3.227 A vertical cylinder (Fig. P3.227) has a 61.18-kg piston locked with a pin, trapping 10 L of R-134a at 40°C with 90% quality inside. Atmospheric pressure is 100 kPa, and the cylinder cross-sectional area is 0.006 m^2. The pin is removed, allowing the piston to move and come to rest with a final temperature of 40°C for the R-134a. Find the final pressure, the work done, and the heat transfer for the R-134a.

Note : at super heat region u = h - pv , where v is the specific volume

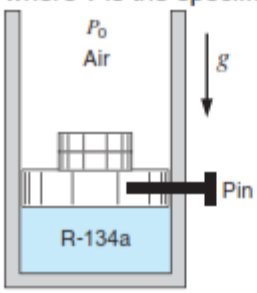

FIGURE P3.227

3.226 A piston held by a pin in an insulated cylinder, shown in Fig. P3.226, contains 2 kg of water at 100°C, with a quality of 98%. The piston has a mass of 102 kg, with cross-sectional area of 100 cm^2, and the ambient pressure is 100 kPa. The pin is released, which allows the piston to move. Determine the final state of the water, assuming the process to be adiabatic.

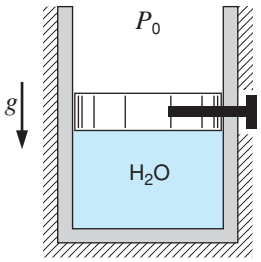

FIGURE P3.226

3.113 Consider two tanks, *A* and *B*, connected by a valve, as shown in Fig. P3.113. Each has a volume of 200 L, and tank *A* has R-410a at 25°C, 10% liquid and 90% vapor by volume, while tank *B* is evacuated. The valve is now opened, and saturated vapor flows from *A* to *B* until the pressure in *B* has reached that in *A*, at which point the valve is closed. This process occurs slowly such that all temperatures stay at 25°C throughout the process. How much has the quality changed in tank *A* during the process?

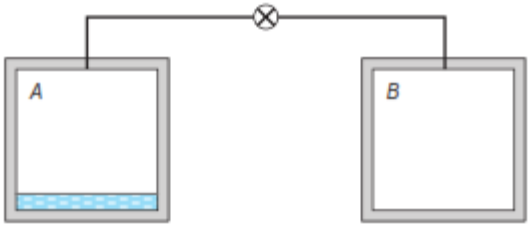

FIGURE P3.113

3.171 Ten kilograms of water in a piston/cylinder arrangement exists as saturated liquid/vapor at 100 kPa, with a quality of 50%. The system is now heated so that the volume triples. The mass of the piston is such that a cylinder pressure of 200 kPa will float it, as in Fig. P3.171. Find the final temperature and the heat transfer in the process.

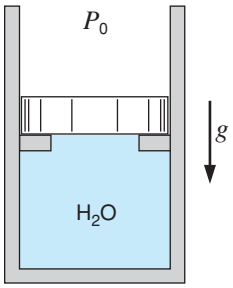

FIGURE P3.171

3.231 A piston/cylinder arrangement has a linear spring and the outside atmosphere acting on the piston shown in Fig. P3.231. It contains water at 3 MPa and 400°C with a volume of 0.1 m^3. If the piston is at the bottom, the spring exerts a force such that a pressure of 200 kPa inside is required to balance the forces. The system now cools until the pressure reaches 1 MPa. Find the heat transfer for the process.

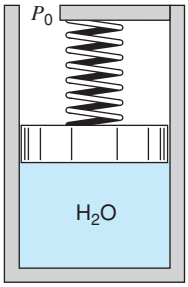

FIGURE P3.231

3.52 Two tanks are connected as shown in Fig. P3.52, both containing water. Tank *A* is at 200 kPa, $v = 0.5\ m^3/kg$, $V_A = 1\ m^3$, and tank *B* contains 3.5 kg at 0.5 MPa and 400°C. The valve is now opened and the two tanks come to a uniform state. Find the final specific volume.

FIGURE P3.52