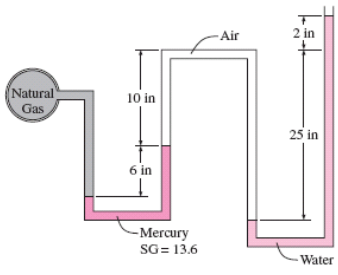
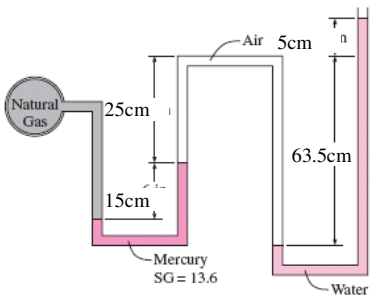
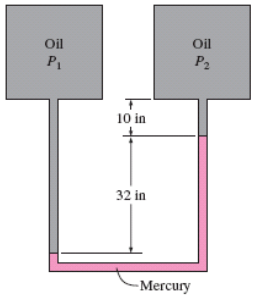
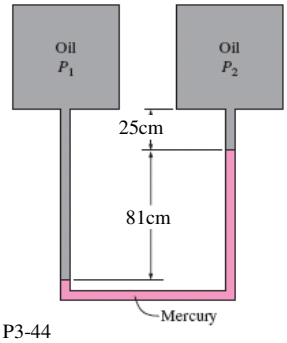
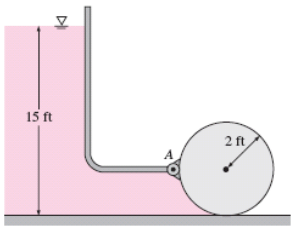
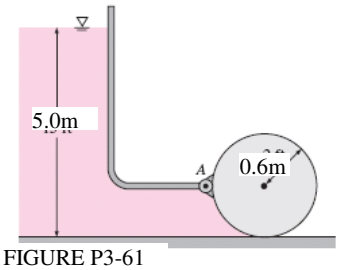
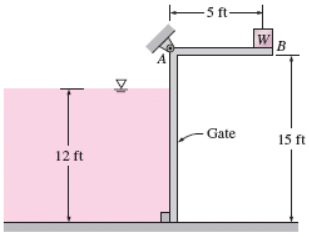
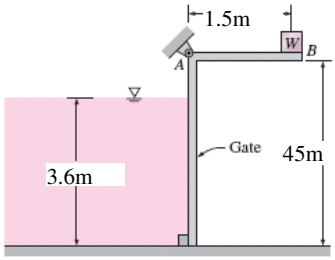
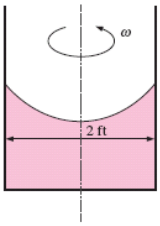
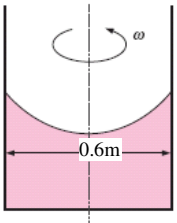
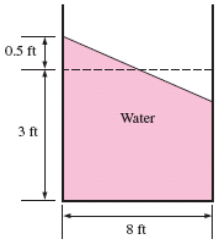
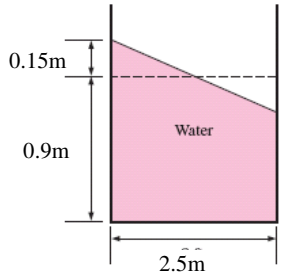
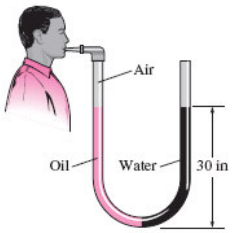
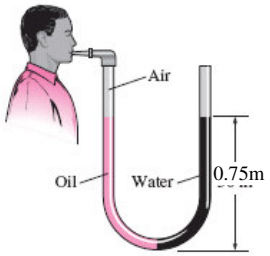
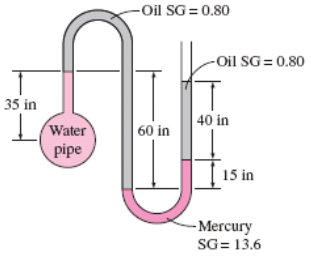
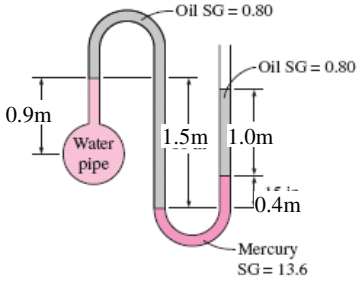
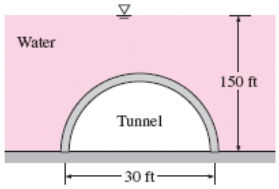
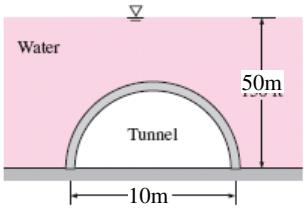
Page No	Current version	Corrected version
104	**3–8E** A manometer is used to measure the air pressure in a tank. The fluid used has a specific gravity of 1.25, and the differential height between the two arms of the manometer is 28 in. If the local atmospheric pressure is 12.7 psia, determine the absolute pressure in the tank for the cases of the manometer arm with the (*a*) higher and (*b*) lower fluid level being attached to the tank.	3-8 A manometer is used to measure the air pressure in a tank. The fluid used has a specific gravity of 1.25, and the differential height between the two arms of the manometer is 71cm. If the local atmospheric pressure is 87.56kPa, determine the absolute pressure in the tank for the cases of the manometer arm with the (a) higher and (b) lower fluid level being attached to the tank.
104	**3–13E** Show that 1 kgf/cm^2 = 14.223 psi.	3-13 Show that 1kgf/cm^2 = 98.1kPa
104	**3–14E** A 200-lb man has a total foot imprint area of 72 in^2. Determine the pressure this man exerts on the ground if (*a*) he stands on both feet and (*b*) he stands on one foot.	3-14 A 91kg man has a total foot imprint area of 464.5 cm^2. Determine the pressure this man exerts on the ground if (a) he stands on both feet and (b) he stands on one foot.
104	**3–17E** A pressure gage connected to a tank reads 50 psi at a location where the barometric reading is 29.1 inHg. Determine the absolute pressure in the tank. Take ρ_{Hg} = 848.4 lbm/ft^3. *Answer:* 64.29 psia	3-17 A pressure gauge connected to a tank reads 344.733kPa at a location where the barometric reading is 74cm in Hg. Determine the absolute pressure in the tank. Take ρHg = 13600kg/m^3. Answer: 443.46kPa
105	**3–23E** Determine the pressure exerted on the surface of a submarine cruising 300 ft below the free surface of the sea. Assume that the barometric pressure is 14.7 psia and the specific gravity of seawater is 1.03.	3-23 Determine the pressure exerted on the surface of a submarine cruising 91m below the free surface of the sea. Assume that the barometric pressure is 101.35kPa and the specific gravity is 1.03.
106	**3–38E** The pressure in a natural gas pipeline is measured by the manometer shown in Fig. P3–38E with one of the arms open to the atmosphere where the local atmospheric pressure is 14.2 psia. Determine the absolute pressure in the pipeline.	3-38 The pressure in a natural gas pipeline is measured by the manometer shown in Fig. P3-38 with one of the arms open to the atmosphere where the local atmospheric pressure is 97.9kPa. Determine the absolute pressure in the pipeline.
106	 FIGURE P3–38E	 FIGURE P3-38
106	**3–39E** Repeat Prob. 3–38E by replacing air by oil with a specific gravity of 0.69.	3-38 Repeat Prob. 3-38 by replacing air by oil with a specific gravity of 0.69.

107	**3–44E** Two oil tanks are connected to each other through a manometer. If the difference between the mercury levels in the two arms is 32 in, determine the pressure difference between the two tanks. The densities of oil and mercury are 45 lbm/ft^3 and 848 lbm/ft^3, respectively.	3-44 Two oil tanks are connected to each other through a manometer. If the difference between the mercury levels in the two arms is 81cm, determine the pressure difference between the two tanks. The densities of oil and mercury are 720.83kg/m^3, and 13583.65 kg/m^3 repectively.
107	 FIGURE P3–44E	 FIGURE P3-44
109	**3–61E** A long, solid cylinder of radius 2 ft hinged at point *A* is used as an automatic gate, as shown in Fig. P3–61E. When the water level reaches 15 ft, the cylindrical gate opens by turning about the hinge at point *A*. Determine (*a*) the hydrostatic force acting on the cylinder and its line of action when the gate opens and (*b*) the weight of the cylinder per ft length of the cylinder.	3-61 A long, solid cylinder of radius 0.6m hinged at point A is used as an automatic gate, as shown in Fig. P3-61. When the water level reaches 5.0m, the cylindrical gate opens by turning about the hinge at point A. Determine (a) the hydrostatic force acting in the cylinder and its line of action when the gate opens and (b) the weight of the cylinder per m length of the cylinder.
109	 FIGURE P3–61E	 FIGURE P3-61
109	**3–63E** Consider a 200-ft-high, 1200-ft-wide dam filled to capacity. Determine (*a*) the hydrostatic force on the dam and (*b*) the force per unit area of the dam near the top and near the bottom.	3-63 Consider a 60m high, 360m wide dam filled to capacity. Determine (a) the hydrostatic force on the dam and (b) the force per unit area of the dam near the top and ner the bottom.
110	**3–68E** The flow of water from a reservoir is controlled by a 5-ft-wide L-shaped gate hinged at point *A*, as shown in Fig. P3–68E. If it is desired that the gate open when the water height is 12 ft, determine the mass of the required weight *W*. *Answer:* 30,900 lbm	3-68 The flow of water from a reservoir is controlled by a 1.8m wide L-shaped gate hinged at point A, as shown in Fig.P3-68. If it is desired that the gate open when the water height is 3.6m, determine the mass of the required weight W.

110	 FIGURE P3–68E	 FIGURE P3-68
110	**3–69E** Repeat Prob. 3–68E for a water height of 8 ft.	3-69 Repeat Prob. 3-68 for a water height of 2.4m.
111	**3–83E** A crane is used to lower weights into a lake for an underwater construction project. Determine the tension in the rope of the crane due to a 3-ft-diameter spherical steel block (density = 494 lbm/ft^3) when it is (*a*) suspended in the air and (*b*) completely immersed in water.	3-83 A crane is used to lower weights into a lake for an underwater construction project. Determine the tension in the rope of the crane due to a 1.0m diameter spherical steel block (density = 7913kg/m^3) when it is (a) suspended in the air and (b) completely immersed in water.
112	**3–97E** A 2-ft-diameter vertical cylindrical tank open to the atmosphere contains 1-ft-high water. The tank is now rotated about the centerline, and the water level drops at the center while it rises at the edges. Determine the angular velocity at which the bottom of the tank will first be exposed. Also determine the maximum water height at this moment.	3-97 A 0.6m diameter vertical cylindrical tank open to the atmosphere contains 0.3m high water. The tank is now rotated about the centerline, and the water level drops at the certer while it rises at the edges. Determine angular velocity at which the bottom of the tank will first be exposed. Also determine the maximum water height at this moment.
112	 FIGURE P3–97E	 FIGURE P3-97
113	**3–107E** A 20-ft-long, 8-ft-high rectangular tank open to the atmosphere is towed by a truck on a level road. The tank is filled with water to a depth of 6 ft. Determine the maximum acceleration or deceleration allowed if no water is to spill during towing.	3-107 A 6m long, 2.5m high rectangular tank open to the atmosphere is towed by a truck on a level road. The tank is filled with water to a depth of 2m. Determine the maximum acceleration or deceleration allowed if no water to spill during toeing.
113	**3–108E** An 8-ft-long tank open to the atmosphere initially contains 3-ft-high water. It is being towed by a truck on a level road. The truck driver applies the brakes and the water level at the front rises 0.5 ft above the initial level. Determine the deceleration of the truck. *Answer:* 4.08 ft/s^2	3-108 A 2.5m long tank open to the atmosphere initially contains 0.9m high water. It is being towed by a truck on a level road. The truck driver applies the

		brakes and the water level at the front rises 15cm above the initial level. Determine the deceleration of the truck. *Answer: 2.4m/s^2*
113	 FIGURE P3–108E	 FIGURE P3-108
114	**3–114E** The pressure in a steam boiler is given to be 75 kgf/cm^2. Express this pressure in psi, kPa, atm, and bars.	3-114 The pressure in a steam boiler is given to be 75kgf/cm^2. Express this pressure in kPa, atm and bars.
115	**3–122E** Consider a U-tube whose arms are open to the atmosphere. Now equal volumes of water and light oil (ρ = 49.3 lbm/ft^3) are poured from different arms. A person blows from the oil side of the U-tube until the contact surface of the two fluids moves to the bottom of the U-tube, and thus the liquid levels in the two arms are the same. If the fluid height in each arm is 30 in, determine the gage pressure the person exerts on the oil by blowing.	3-122 Consider a U-tube whose arms are open to the atmosphere. Now equal volumes of water and light oil (ρ=789.7kg/m^3) are poured from different arms. A person blows from the oil side of the U-tube untill the contact surface of the two fluids moves to the botttom of the U-tube, and thus the liquid levels in the two arms are the same. If the fluid height in arm is 0.75m, determine the gauge pressure the person exerts on the oil by blowing.
115	 FIGURE P3–122E	 FIGURE P3-122 E
116	**3–126E** A water pipe is connected to a double-U manometer as shown in Fig. P3–1026E at a location where the local atmospheric pressure is 14.2 psia. Determine the absolute pressure at the center of the pipe.	3-126 A water pipe is connected to a double – U manometer as shown in Fig. P3-126 at a location where the local atmospheric pressure is 97.9kPa. Determine the absolute pressure at the center of the pipe.

116	 **FIGURE P3–126E**	 FIGURE P3-126
118	**3–141E** A semicircular 30-ft-diameter tunnel is to be built under a 150-ft-deep, 800-ft-long lake, as shown in Fig. P3–141E. Determine the total hydrostatic force acting on the roof of the tunnel.	3-141 A semicircular 10m diameter tunnel is to be built under a 50m deep, 250m long lake, as shown in Fig. P3-141, Determine the total hydrostatic force acting on the roof of the tunnel.
119	 **FIGURE P3–141E**	 FIGURE P3-141