

A very large aquarium 10.0 meters deep, 20.0 meters wide and 30.0 meters long and is filled with fresh water at 4°C. A wind is blowing parallel to the 20-meter wall at a speed of 5.0 meters per second. Where the wind isn't blowing, such as on the top of the aquarium, the air pressure is exactly 1.0 atm.

Find the net force due to the wind and water against the 20-meter wall.

Topics covered in Chapter 14:

- Pressure is defined as $P \equiv \frac{F}{A}$
- Density is defined as $\rho \equiv \frac{m}{V}$
- Archimedes Principle is “*The buoyant force is upward and equal to the weight of the fluid displaced*”. For these types of problems, always start out with a FBD.
- Bernoulli's Equation discusses fluids in motion. You can derive Bernoulli's equation by using conservation of energy: $P_0 + \rho gh_0 + \frac{1}{2} \rho v_0^2 = P_1 + \rho gh_1 + \frac{1}{2} \rho v_1^2$
- Elasticity is discussed at the end of the chapter.