

EPA's APTI
Course #450/468

***Monitoring Compliance Testing
and
Source Test Observations***

Problem Set 1

1. If an ideal gas has a volume of 20 cubic feet at 235 °F and 29.91 in. of Hg, what will its volume be at 68 °F and 29.80 in. of Hg?
2. If 20 L of gas contained in a balloon under a pressure of 29.92 in. of Hg are moved to a location where the atmospheric pressure is 26.5 in. of Hg, what will its new volume be?
3. How many moles are in 1.6 lbs of oxygen? In 35 mL of water?
4. If the Δp across a pitot tube manometer is 1.5 in. of water, the stack temperature is 286 °F, and the static pressure is + 1.2 in. of water, the barometric pressure is 29.86 in. of Hg, the pitot tube has a $C_p = 0.81$, and the stack gas molecular weight is 30 lb/lb-mole, what is the flue gas velocity.
5. What would be the velocity if the $C_p=0.84$?
6. If a Federal Reference Method 5 source test determined that a particulate concentration was 0.70 grains/dscf, what would be the pollutant mass rate in tons per year? Use the velocity calculated in Problem #4 for $C_p=0.81$ and assume that the velocity traverse was conducted on a 15 ft. diameter stack and that the moisture content of the stack gas was 12%.