Very Low Pressure Applications:

Three examples of typical very low pressure applications which will be discussed include air flow measurement, critical room pressurization measurement, and leak detection. Each of these applications present their own unique challenges, which are discussed below.

Air Flow Measurement:

Air flow in a duct is commonly measured using a pitot tube (refer to figure 2). Based on the simplified Bernoulli equation below, the differential pressure across the pitot tube is proportional to velocity of the air in the duct squared. Therefore, when velocity increases by a factor of 2X, pressure increases by a factor of 2^2, or 4X. The measurement challenge is the wide span of flow rate, high static pressures and the accuracy and repeatability needed to maintain the system. For example, we have measured an air flow from 400 Ft/min (122 Meters/Min) to 1600 Ft/min (488 Meters/Min) with corresponding differential pressure values of 0.01 in. H_2O and 0.16 in. H_2O (2.49 and 39.85 Pa). This common application shows that the transducer must provide accurate readings from the lowest value to a high value that is 16 times greater, requiring that the transducer provides enough resolution and accuracy to measure and reliably report the low value of 0.01 in. H_2O (2.49 Pa). Furthermore, the difference between these miniscule pressure differentials must be unaffected by a much higher static pressure in the duct.

$$v = 2\sqrt{\frac{(p_2 - p_1)}{\rho}}$$

v = Flow Velocity

p_2 = Dynamic Pressure

p_1 = Static P ressure

ρ = Density

Simplified Bernoulli Equation

Figure 2: *Air Flow measurement using a Pitot tube*