

PRESSURE TESTING

CORRECTION OF PRESSURE MEASUREMENTS

ATMOSPHERIC PRESSURE

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1. GENERAL

1.01 This is a new section which outlines the methods employed to convert pressure measurements made under different atmospheric pressures due to weather conditions to their equivalent values at a common atmospheric pressure.

2. MEASUREMENT OF ATMOSPHERIC PRESSURE

2.01 Atmospheric pressure is measured with a barometer and is generally expressed in inches of mercury. Average sea level atmospheric pressure is approximately 30 inches of mercury; this is referred to as the normal barometric pressure. As 30 inches of mercury is equivalent to about 15 pounds per square inch, one-inch change in barometer is equivalent to a change of 1/2 pound in atmospheric pressure. At elevations above sea level, the atmospheric pressure is less; however, the scale of the local barometer is set so the 30-inch graduation corresponds to the normal atmospheric pressure at the location regardless of altitude.

2.02 Barometer readings generally can be obtained from the nearest weather bureau or airway station. Where this is found impracticable, barometers may be installed at test-boards or other offices. These local barometers should be checked against weather bureau or airway barometers and adjusted to read alike.

2.03 A barometer reading should be obtained for each day on which pressure measurements are made, and as close to the time of the measurements as practicable. Where a series of pressure measurements are to be compared, all barometer readings used to correct such measurements should be obtained from the same source. Except during periods of rapidly changing weather, barometer readings from a particular source may

be applied to correct pressure readings taken within 50 to 75 miles of that source.

3. CORRECTION OF ATMOSPHERIC PRESSURE

3.01 Measured pressures can be converted to their equivalent values at normal barometric pressure of 30 inches of mercury as follows: Determine the difference between 30 inches and the barometer reading in inches. Divide this difference by 2 (because one inch of mercury = one-half pound pressure). Add this value to the pressure reading if the barometer reads more than 30 inches; subtract it, if the barometer reading is less than 30 inches.

3.02 For example: Assume that pressure readings have been made for the purpose of determining the rate of gas loss in a gas section. The first set of readings were found to average 6.8 pounds at 60° F. with a barometer reading of 29.6 inches. A second set of readings was taken ten days later and at that time, the average pressure was found to be 6.4 pounds at 60° F. with a barometer reading of 30.2 inches.

(a) First, convert the average pressure found for the first set of readings to normal barometric pressure. Subtract 29.6 inches from 30.0 inches (normal): $30.0 - 29.6 = .4$ inch. Divide this value by two to convert inches to pounds: $.4 \div 2 = .2$ pound.

(b) Since the barometer reading was less than 30.0 inches, subtract the value found in (a) from the average pressure reading: $6.8 - .2 = 6.6$ pounds.

(c) Next, convert the average pressure found for the second set of readings to normal barometric pressure. Subtract 30.0 inches (normal) from 30.2 inches: $30.2 - 30.0 = .2$ inch. Divide this value by two to convert inches to pounds: $.2 \div 2 = .1$ pound.

(d) Since the barometer reading was more than 30 inches, add the value found in (c) to the average pressure reading: $6.4 + .1 = 6.5$ pounds.

(e) The true pressure loss in 10 days is $6.6 - 6.5 = .1$ pound, and in 30 days is $.1 \times 30/10 = .3$ pound.

3.03 If correction for the variation in atmospheric pressure due to weather conditions had been omitted in the above example, the computed loss would have been $6.8 - 6.4 = .4$ pound in 10 days or $.4 \times 30/10 = 1.2$ pounds in 30 days.

3.04 If the B Pressure Testing Rule is available, measured cable pressures may be converted to their equivalent values at normal barometric pressure directly and conveniently with the rule. Instructions for its use are printed on the rule.