TELEDYNE
Analytical Instruments

Calibration Gas Test
For a 9060 Oxygen Probe

Teledyne oxygen probes are true in-situ oxygen sensors. The sensing point for a 9060 probe without filters is 62mm from the tip of the probe. When calibration gas is applied to the probe, while it is in the process, dilution of the calibration gas occurs due to some mixing with the process gases. The amount of dilution is dependent mainly on the gas velocity of the process gas past the tip of the probe.

If the process gas was at 2% oxygen and a 5% calibration gas used, than the oxygen reading would rise but would not be able to reach the value of the calibration gas; it may reach 4.5% but some dilution will occur. Likewise if 0.5% gas was used then the reading may fall to1.0% or 0.75% but would not reach the 0.5% value.

The purpose of the calibration gas test is to prove that the probe is responding to changes in oxygen levels. If the analyzer was adjusted to read the 5% value of the calibration gas, than this would result in incorrect readings of the process gas, the 2% process gas would now be interpreted as greater than 2.5%. If the oxygen reading is used to control the air / fuel ratio of the combustion process than this is a dangerous condition as the actual value of the process gas would be 0.5% lower than the indicated value.

As a last resort, to prove a 9060 oxygen probe is reading correct oxygen levels, it must be removed from the process and a calibration gas introduced at a rate of 3 to 4 liters per minute. If the probe is being tested in a windy or drafty area, than use an end cap to restrict the tip of the probe to prevent ambient air dilution of the calibration gas.

READING LOW

If the probe appears to be reading low, this can be caused by a build up of hydrocarbons at the sensor running at 720°C and consuming the oxygen that should be measured due to combustion. A solution to this is to pump air into the calibration port to increase the consumption rate of the hydrocarbons. Having an excessive flow of reference air or calibration gas can also cause a low reading; this causes a cooling effect on the zirconia sensor. Reference airflow should be approximately 50cc/min. If the problem persists than replace or return the probe to Teledyne.

READING HIGH

If the probe appears to be reading high, than the reference air should be checked. Remove the cap on the probe and pull the hypodermic from the four bore insulator, place the hypodermic in a glass of water to observe air flow. If the process operates under a negative pressure than check that the 1/8-inch NPT plug screwed into the calibration port on the probe is not leaking. A broken sensor will also cause a high oxygen reading because the process gas will be mixing with the reference air. If the problem persists than replace or return the probe to Teledyne.