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Calibration gases are rated with a shelf life. Reactive gases have a much shorter shelf life than non-reactive gases. For some commonly used calibration gases the shelf life can be as short as 6 months, for others it is limited to a year. When the cylinder reaches its expiration date or its “Best Used Before” date the concentration of target gas in the cylinder may have decayed to a point where it is below the minimally accepted level. It is out of tolerance.

The main factor in a reactive calibration gas losing its strength are reactions that take place inside the cylinder. There are two key reasons why this will take place even when it is not being used.

1. The material of the cylinder itself will to some extent react with the with the gas in the cylinder.
2. Impurities in the air mixture, such as humidity and the presence of other gases may promote a reaction.

Manufacturers of high quality calibration cylinders go to great lengths to perfect the lining inside the cylinder so that the reaction between the cylinder material and the calibration gas is minimal. Further, the manufacturers of the gas must go to great lengths to ensure purity when manufacturing the gas and when filling the cylinders. Even a trace amount of water vapor in the cylinder will contribute to a more rapid decay of the calibration gas.

Besides the cylinder and gas purity there is one more way that the calibration gas can decay faster than expected: Introduction of impurities and water vapors into the cylinder by the user.

It is important that the valve and threads in the cylinder as well as the threads on the regulator are kept clean. Any dirt on the fittings may find its way into the cylinder when the regulator is attached. Store the regulator in a clean and dry environment. Another common reason for the calibration gas to become contaminated is by the introduction of ambient humid air into the gas cylinder. At first it doesn't seem logical that ambient air can enter a cylinder of compressed gas. The answer lies in the regulator. If the regulator is equipped with an on/off knob and the knob is in the closed position when the regulator is attached to the cylinder, a small amount of ambient air will be trapped as the regulator is screwed onto the gas cylinder. Once the regulator is screwed in place the pressure between the cylinder and the small cavity in the regulator equilibrates resulting in a free flow mixing of the two air sources. All it takes for some reactive gases is a couple of small “doses” of humid ambient air to totally ruin the gas.

To prevent this from happening the on/off knob on the regulator should always be on the open position when the regulator is attached. When doing so the pressure of the gas cylinder will force the air, otherwise trapped, out of the regulator. If so desired the on/off knob can be closed within a second or two.

In order to eliminate the possibility of introduction to ambient air into a gas cylinder Biosystems does not offer regulators with on/off knobs as a standard feature. We recommend that the attachment and removal of the unrestricted regulator be used as the method for starting and stopping the flow of calibration gas.