DataTrace Technical Note

Technical Note

Date: March 18, 2011

Subject: Heat Treatment for Preserving Calibration of Humidity Data Loggers

Data loggers that measure relative humidity (RH) and temperature are routinely used in Ethylene Oxide (EO) sterilization processes for validation and routine monitoring. Unfortunately, EO is a very reactive compound and when RH sensors are exposed to EO, changes can occur in the RH calibration of the data logger.

The Honeywell model HIH-4000 sensor is the most widely used sensor in RH data loggers, including the DataTrace Micropack-III. It is well known that the calibration shift of these HIH-4000 sensors can be quite large following EO exposure. The degree of shift depends on the length of EO exposure, but it can also vary dramatically between individual sensors. Some sensors exhibit large shifts and others do not. Fortunately, there is a simple heat treatment process that can be used to return our sensors to a calibrated state relatively easily. Illustrated below is a typical calibration shift of an HIH-4000 sensor following EO exposure, in this case 57 total hours. After an overnight heat treatment at 85˚C, the calibration state was measured again. Calibration was restored by this treatment, and throughout the range the error was less than +/- 5% RH, which is the generally accepted tolerance limit currently adopted by most companies utilizing EO sterilization processes. Mesa recommends that all MP-III and MP-RF humidity data loggers that are used in EO processes are periodically subjected to an overnight heat treatment between 80˚C and 85˚C to maintain their accuracy.