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Thermo 49i Servicing

Reading the Calibration section of the 49i manual can be quite daunting, but we like to let customers know that UV photometry is a primary method, and rarely, if ever, needs to be re-calibrated. We usually suggest that they label the span coefficient of a new instrument (say 1.017) and post it on the front panel. 10 years later, when they are ready to trade-in the analyzer, the span coefficient should still be the same. This does not mean that the analyzer will always read correctly. Problems with the instrument will give incorrect readings (almost always making it read low). Routinely referencing it to a transfer standard or primary standard is necessary. However, if the analyzer is not reading correctly, defining and fixing the problem is advised, rather than changing the span coefficient.

Some of the common problems are:

- **Sample Filter: A leaking filter holder or a heavily loaded filter can cause incorrect readings. Ozone is very reactive and can be absorbed by dirt on the sample filter. Instruments with the internal ozonator option should have the filter located between the Out port and the In port on the back of the analyzer. In this way, any problems with the filter will be highlighted in the daily zero/span checks.**
- **Ozone Scrubber: This is the most commonly replaced item and having a spare on hand is highly recommended. It generally lasts from 1 to 5 years, depending upon the dust and gaseous compounds in the air. To test the scrubber, generate an Ozone point, either from an external source or from the internal Ozonator, and let it stabilize. Then replace the scrubber with a new one, and let it stabilize again. If the reading stabilizes at a higher value, then the old scrubber is contaminated, and should be thrown out. If the reading does not change, the old scrubber is still OK, and can be re-installed.**

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- **Solenoid Valves: The 49i contains two sample/reference solenoid valves which usually switch every 10 seconds. These valves can last 5 years or more, but generally, dirt on the seat, or "cold-flowing" of the soft Teflon will cause them to leak. See the posting of "Thermo 49i Cell A/B Leak Test" for a procedure to test the valves. If a spare set of new solenoid valves is available, they can be swapped out to see if the readings increase, similar to the scrubber test. Whether there is reference leaking into the sample, or sample leaking into the reference, the result is the same; a lower sample/reference ratio, and lower Ozone concentrations.**
- **Dirt: It is generally a good idea to routinely check the photometer tubes for particulate. Simply remove one of the tubes (keep the bottom of the tube on the bottom, don't rotate) and hold one end up to the light. It is not unusual to see a small coating of particulate on the bottom, and a general haziness of the tube walls. We usually wad up a piece of paper towelling (nothing real abrasive, such as Kimwipe), moisten it, stuff it into the end of the tube (don't jam it in, just a snug fit), then push it through with a clean piece of 1/4″ Teflon tubing so that the tube walls do not get scratched. Repeat once or twice. Blow out the excess water. A heat gun is handy to remove any remaining moisture. Re-assemble. Repeat with the other tube. Generally, cleaning the tubes will slightly increase the lamp intensity, but will usually not affect the readings much. Any "Teflon fluff" indicates deteriorating solenoid valves, and is another good reason to routinely check these tubes.**