

CO GAS AND UMBILICAL ISSUES

Did you know that your umbilical material can affect your CO readings? Here is a phenomena we discovered recently that might help some users who measure CO and need to order new or replacement umbilicals, or wonder why they have trouble with 7 day drift tests, low range CGA's or RATA's:

The cal gas line in a typical CEMS umbilical is made of PFA teflon tubing. Because this material is used, problems when monitoring low levels of CO can occur (ranges less than 100 PPM or monitored levels less than 50 PPM).

When PFA reaches a temperature of 200 degrees F or higher, it starts to out-gas CO. The CO out-gas rate can be as high as 4-10 ppm. This is a significant number when measuring low levels of CO in a CEMS. The problem is even worse with new tubing.

This CO out-gassing produces yet another problem, The CO is adsorbed into the walls of the Teflon and then slowly releases itself (desorbs). In dual range systems where the high range can be upwards of 5000 ppm and the low range down near 20 ppm, a system will have great difficulty reaching a stable reading for the zero and low range daily calibration checks.

In order to correct for this, calibration sequencing would have to be changed and/or the calibration time for zero and low range span would have to be lengthened. This can be a problem especially during a 7 day drift test and can also cause major problems during a low range CGA or RATA.

One solution that the tubing manufacturers have been experimenting with is placing the tubing in an oven at an elevated temperature and running clean air through the tubes. The tubes are then flushed with alcohol and dried.

This solution is helpful and adds a relatively low cost to the tubing of about \$1 to \$2 per foot. The alternative – using high purity Teflon to minimize the problem – is \$3 to \$4 per foot and not reasonably cost effective.

So next time you get ready to replace a CEMS umbilical, if low range CO measurement is an issue, make sure to order “pre-cleaned and conditioned” PFA teflon tubing. The manufacturers call this “Clean Tube”.

Another option is substituting the teflon tubing with stainless steel tubing in the umbilical. Prices are comparable to Teflon tubing, but keep in mind that installation can be much trickier as the tubing is heavier and more difficult to bend.

Time to Replace Your Existing CEMS Umbilical due to Age or Performance?...

Did you know that all umbilicals are not created equal? There are many considerations when replacing an umbilical including:

- ◆ Number of tubes required, including spares
- ◆ Thermocouple extension and type
- ◆ Number of wires (i.e. probe heater, solenoid, etc.)
- ◆ Heating circuit power requirement
- ◆ Diameter and bend radius
- ◆ Distance limitations

If you need to replace your umbilical, please give Monitoring Solutions a call. Our Project Engineers will work with you on all the details of your application to insure you get the proper replacement at a competitive cost.

We supply name brand OEM products for most manufacturers' CEMS.



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Umbilical Issues with CO:

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