TC 3000
external calibration cell
for NH_3

Your eye in hell

Siemens Laser Analytics

TC 3000 Calibration check manual
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1. TC 3000 – external calibration cell for NH_3

1.1 General

This external calibration cell is intended for use together with a LDS3000 instrument (for NH_3) to provide a verification of the calibration. It requires that the customer has access to a certified gas bottle containing the NH_3. Suitable levels are 100 - 200 ppm.

Note!

The calibration procedure is very complicated and sometimes involves many parameters. Therefore the use of TC 3000 should be restricted to a check of the calibrating status of LDS 3000 – not to perform an actual calibration. When the calibration check is done it is important that the settings on LDS 3000 and the environment parameters are the same in all occasions. If this check shows that the calibration has drifted a recalibration should be done by trained and certified personnel.

1.2 Verification procedure

- ✓ Move the sensor boxes from the normal measurement location to the external calibration cell.
- ✓ Align the sensor according to the same procedure as for a normal installation (see Sensor manual)
- ✓ Check and if necessary adjust sensor gain to achieve around 2000 transmission rms (see Installation Manual: chapter 4.2)
- ✓ Set up the instrument so that the input parameters correspond to the external calibration cell and not the normal measurement location – **path length** (typical around 1m, actual value given on the cell) – **process temperature** (typically 23 °C) – **unit** (ppm or mg/Nm^3 whatever the gas bottle concentration is given in).
- ✓ Flush the cell with instrument air or nitrogen to make sure that no remaining NH_3 has been left since the last calibration.
- ✓ Check instrument reading, should be around 0 ppm, below 1 ppm for a 1m cell
- ✓ Attach the certified gas bottle.
- ✓ Flush slowly (2-5 l/min) through the cell. The outlet of the cell could be into a water bottle to prevent releasing NH_3 in the environment.
- ✓ Observe the reading of the instrument and wait until it has stabilized. This could take quite some time, sometimes up to an hour.
- ✓ After the reading has stabilized, compare the reading of the instrument with that on the certified gas bottle. They should agree to within 2% plus the accuracy on gas bottle. Make sure that the units used are the same on the gas bottle and for the instrument (ppm for both or mg/Nm^3 for both).
- ✓ If reading is OK, stop the NH_3 flushing and and use instrument air/N_2 instead until a zero reading (<1 ppm) has been reached.
- ✓ If the reading is not within 2% plus the accuracy of gas bottle, please consult with Siemens Laser Analytics.
- ✓ Finish the verification procedure by returning the parameters to those

corresponding to the measurement location (path length, process temperature, unit).

- ✓ Mount the sensor back on the normal measurement location.
- ✓ Align the sensor according to the normal procedure (see Sensor Manual)
- ✓ Check and if necessary adjust sensor gain to achieve around 2000 transmission rms (see Installation Manual: chapter 4.2).

Useful relations:

$°F = 1.8 \cdot °C + 32$

$mg/Nm^3 = ppm \cdot$ *(molecular weight of the gas) / (litres/mole)*

1 atm and 0 °C → litres/mole = 22.41 (STP) labelled mg/Nm³ EU in LDS 3000
1 atm and 25 °C → litres/mole = 24.46 labelled mg/Nm³ US in LDS 3000