



Standard Operating Procedure
Air Quality Section
Department of Labour Inspection

Issue Date:

07/02/2011

Rev.:

1

DLI-SOP-233 Level 1 maintenance of CO analysers

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Prepared by: _____ Date: _____


Reviewed by: _____ Date: _____

Approved by: _____ Date: _____

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Purpose

To describe the procedure to be followed for performing routine maintenance of the ML/EC 9830 CO analysers in the monitoring network.

Principle

This SOP applies to ML/EC 9830 CO analysers. Filter and scrubber changing procedures are taken from the service manual of the analyser. Cleaning and spare part changing procedures are not described here but are to be obtained directly from the service manual.

Staff involved


This SOP is intended for the staff of the maintenance company who perform the activities described.

Equipment

- Carbon monoxide monitor (Ecotech ML/EC 9830)
- Station data processor (Ecotech)

Documentation and forms

This SOP requires the form *DLI-F-37 CO Analyser Maintenance Report*.
The completed form is stored in electronic form in the file *DLI-F-37 CO Analyser Maintenance Report-sn-yyyy-mm-dd.xls*, where *sn* denotes the analyser serial number, *yyyy* the year, *mm* the month and *dd* the date of the maintenance.
The paper copy of the form is stored in the history log book of the analyser.

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Procedure

General

Perform the scheduled maintenance as required by the maintenance schedule DLI-QD-103.

Registration of general information and status parameters

Registration of general information:


- Enter name of customer, analyser model, analyser serial number and job number in **Customer**, **Instrument**, **ID No.** and **System/Job No.** fields respectively.
- Enter name of operator, date of test, start time and where the test was performed in **Maintenance Performed by**, **Date**, **Time Begin** (left field) and **Location** fields respectively.

Registration of reference information (section Calibration Equipment, where applicable):

- Enter flow calibrator model, calibrator serial number, pressure calibrator model and calibrator serial number in **Flow Calibrator Model**, **ID/Serial No.**, **Pressure Calibrator Model** and **ID/Serial No.** fields respectively.

Registration of analyser status parameters (section Displayed Instrument Parameters):

- On the analyser keyboard hit **<Exit>** to return to the primary screen.
- Push the **Select** button to enter the main menu. Use the **Up** and **Down** arrows on the keyboard to navigate in the main menu. Push **<Return>** to select a menu item.
- Choose **INSTRUMENT STATUS**.
- From the **INSTRUMENT STATUS** menu read the status parameters and enter them into their respective fields in the **Displayed Instrument Parameters** section of the form.
- Hit **<Exit>** to return to the primary screen.
- Hit **Select** to enter the main menu, choose **SYSTEM TEMPERATURES**.
- From the **SYSTEM TEMPERATURES** menu read the status parameters and enter them into their respective fields in the **Displayed Instrument Parameters** section of the form.
- Hit **<Exit>** to return to the primary screen.
- Hit **Select** to enter the main menu, choose **TEST MENU**.
- In the **TEST MENU** choose **OUTPUT TEST** menu.
- In the **OUTPUT TEST** menu choose **PREPROCESSOR POTS**.
- From the **PREPROCESSOR POTS** menu read the status parameters and enter them into their respective fields in the **Displayed Instrument Parameters** section of the form.

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- Hit <Exit> to return to the primary screen.
- From the primary screen record the measurement units in the **Instrument units** field.
- Compare the recorded values with the acceptance limits. If any values are outside the limits the cause must be investigated.

Leak test

The leak test procedure is taken from the 9830 Series Carbon monoxide Analyzer Service Manual.

Leak test:

- Enter the **INSTRUMENT STATUS** screen and record **GAS PRESSURE** and **AMBIENT PRESSURE** in the **Leak test – Gas pressure** and **Ambient pressure** fields respectively of column **Unplugged**.
- Enter the **TEST MENU**, select the **OUTPUT TEST MENU**, then select **VALVE TEST MENU**; from these items pick **VALVE SEQUENCING** and set to **OFF**.
- Plug the Inlet port on the rear panel and the DFU filter inlet inside the instrument.
- Enter the **INSTRUMENT STATUS** screen and record **GAS PRESSURE** and **AMBIENT PRESSURE** in the **Gas pressure** and **Ambient pressure** fields respectively of column **Plugged**. Both **GAS PRESSURE** and **AMBIENT PRESSURE** should drop to approximately 50% of the normal **GAS PRESSURE** reading. If the readings do not drop to within 10 torr of each other, there is probably a leak.
- Observe **GAS FLOW** and enter its value in the **GAS FLOW** field. It should indicate 0.00 slpm.
- Return to the **OUTPUT TEST MENU**, choose **VALVE TEST MENU**, and select **VALVE SEQUENCING: ON**.
- Press <Exit> and unplug the instrument inlet port and the DFU filter inlet (inside the instrument) and reconnect the sample line.

Replacing filters and scrubbers


References are made to the **Maintenance** section of the form.

Particulate filter replacement

The filter replacement procedure is taken from the 9830 Series Carbon monoxide Analyzer Service Manual. For figures and details on part numbers consult this manual.

Change particulate filter:

- Open the front panel to access the service switches and particulate filter. Disconnect the external pump.

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- Completely unthread the filter cap by turning it counterclockwise.
- Pull the filter plunger out of the body, carefully resting it in a secure place. The O-ring and filter membrane are now exposed inside the filter body.
- Remove, inspect, and wipe down the O-ring. Replace the O-ring only if damaged.
- Remove, discard, and replace the old filter membrane.
- Reinstall the O-ring over the new membrane, reinstall the plunger, and handthread the cap back into place by turning it clockwise. Do not use tools.
- Return the Pump to ON.
- Close the front panel.
- Enter **Y** in the **Particulate filter changed** field if it was changed. Otherwise enter **N**.

Changing scrubbers

Change exhaust scrubber:

- Remove the exhaust canister from the back of the instrument, replace the scrubber material and refit the canister.
- Enter **Y** in the **Changing scrubbers – Exhaust scrubber changed** field if it was changed. Otherwise enter **N**.

Finalizing the visit and completing the form

- Enter the end time of the calibration in the **Time Begin/End** field (right field) in the form.
- Sign the form in the **Technicians Signature** and **Date** fields.
- Before leaving the station record the visit in the station visit log.
- After returning to the lab store the form in the instrument history log book.

Relevant documentation

DLI-QD-230

Form *DLI-F-37 CO Analyser Maintenance Report*

Reference Procedures

Carbon monoxide monitor (Ecotech EC 9830) manual

Revision History

Revision 0