

CONTINUOUS EMISSIONS MONITORING

Complementary to Lowe Engineering's wide experience of sampling and analysis systems for boiler water, steam, hydrocarbons, waste water and other process streams, is that of Continuous Emissions Monitoring of incineration and other exhaust flue and stack gases.

More rigorous enactment of pollution limits and reporting standards places increasing responsibilities on many installations to not only avoid prosecution and/or prohibition orders - but also to meet social environmental concerns as well as optimised combustion conditions.

Lowe can provide integrated packages including system design, overall project coordination and control, manufacture as well as installation and commissioning.

Extractive and in situ systems covering O₂; NO_x; SO_x; CO; CO₂; VOC; HCL etc utilising analysers with a proven track record for reliability, accuracy and robustness.

Particulates, dust monitors, gas flow and temperature measurement can be incorporated into our comprehensive systems.

To further enhance this complete systems capability Lowe has developed CEMData, a PC based data acquisition and report generation package to meet the requirements of the Environment Agency.

This includes up to 120 analogue inputs from any combination of analysers, smoke, temperature, flow etc; customised software; rolling archives of 10 second RAW and 10 minutes averaged data; real time display with interpretation of fault/status signals and incorporation of clients' own headers, comments etc.

To demonstrate compliance and reliable measuring methods in order to meet increasingly stringent and complex requirements, let Lowe Engineering assist you in finding a cost effective solution.



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CEMData

A fully integrated PC-based data acquisition and report generation package developed specifically for the complex requirements of continuous emissions monitoring and reporting.

CEMData has been designed for maximum flexibility combined with ease of use, implemented via a hierarchical system of access control to the following levels:

- Application set-up *Project-specific assignment of measurements, alarms, status signals, acquisition parameters*
- Maintenance mode *On-line tools including built-in digital storage oscilloscope, assignable by software*
- Supervisor mode *Interpretation of legislation into report templates, set-up of all operator parameters, etc.*
- Operator mode *Real-time monitoring and report generation*
Operator access (with or without password) may be assigned to individual functions by the Supervisor

System

Custom-assembled PC system to suit client's requirements, typically 128MB 500MHz PIII, 2 x 8.1GB HDDs, 32x CDR
Operating system Windows® NT 4.0 SP6a
Integrated data acquisition and report generation software written in-house by LOWE Engineering.
On-board PC data acquisition cards, typically 32 x 16-bit Analogue inputs + 32 digital I/O per card.
Very wide range of acquisition cards to suit all applications, including high-density digital I/O.
Analogue and digital output signals as required.
Number of cards limited only by capacity of PC and/or auxiliary chassis.
Serial data I/O via RS232 ports.

Data security and backup

CEMData runs automatically on power-up. A watchdog timer alerts DCS or SCADA of system failure.
Cost effective options include write-only archive on second hard drive, mirrored drives or RAID array.
Data stored in binary format – inaccessible to spreadsheet users, eliminating the possibility of tampering.
File access and security via the NTFS filing system (US Dept. of Defense security level C2).

Data handling

CEMData maintains three rolling data archives of data, each widely configurable for frequency and archive length:

- Real-time data *typically written every 1-2s, over-written after 1 hour*
- Semi-historical data *typically written every 2-10s, over-written after 6 months*
- Main archive *typically written every 1min, over-written after 10 years – used for all report generation*

Time and date representation

All times are stored and displayed in UCT (=GMT). Internal representation uses the FILETIME structure, a 64-bit integer representing the number of 100ns intervals since 1/1/1601.

Operational

Report generation

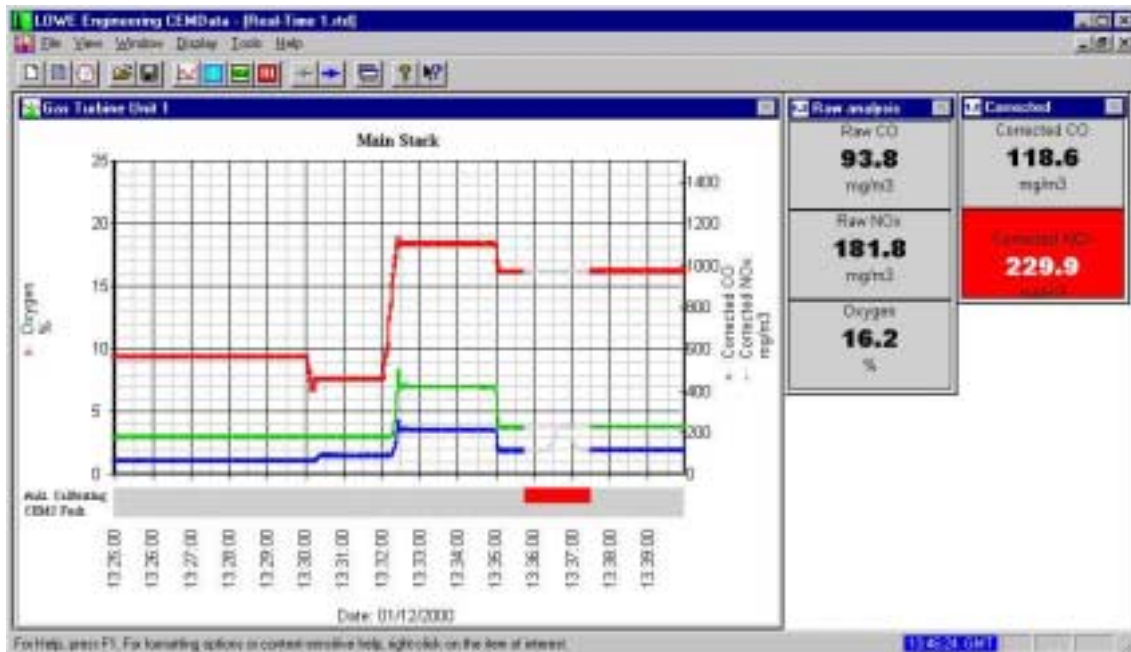
“One-click” report generation to user-generated pre-defined report formats
Fully automatic report generation and printing with flexible options for date/time logic
Printer and printer set-up options stored with each auto-report
Custom reports on demand using pre-defined report formats or freely formatted by the user

Historical data display

Powerful zoom feature for on-screen display of all semi-historical data over any interval up to 24 hours

Real-time display screens

Unlimited number of user-configurable displays with charts, tables, digital meters, annunciators for all real-time data.



Typical real-time display screen

Setting-up a report template



CEMData

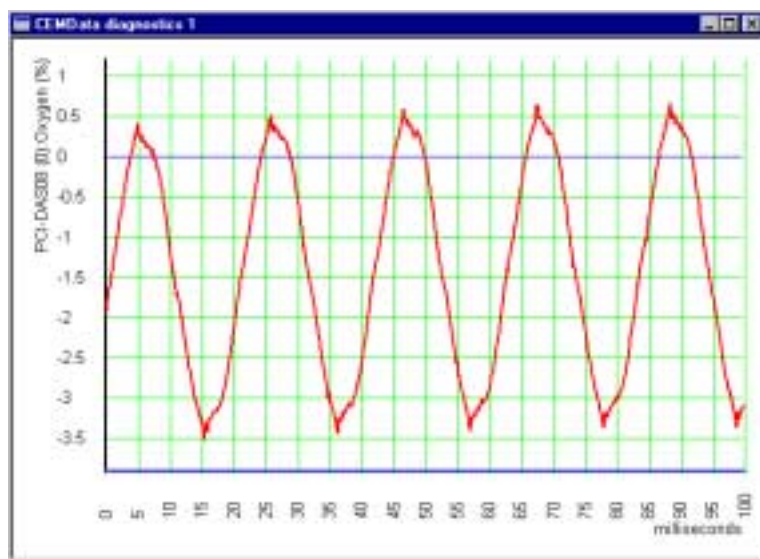
Data acquisition using **CEMData** or via the DCS/SCADA?

CEMData is a fully stand-alone data acquisition and report generation package designed specifically to encompass the specialised and demanding requirements of continuous emissions monitoring. With user-defined rolling archives for real-time, semi-historical and long-term (typically 10-year) data, together with comprehensive real-time displays and “zoom-in” trends of historical data, CEMData has immediate application in those sites which do not have a DCS or SCADA system - and at extremely low cost.

A decision to use a DCS/SCADA for emissions monitoring requires careful consideration, as for all but the simplest applications, the programming issues are potentially complex. The result can be time-consuming, *ad hoc*, site-specific solutions requiring expensive software maintenance as reporting requirements become more stringent. If plant status signals and the fault status of individual analysers and sampling components are to be taken into account (*as they must be*) when generating statistical data, then the software design and implementation will be a decidedly non-trivial operation.

For new projects, contractual considerations are equally important. A fully-configured up-and-running data acquisition and report generation package **fully operational before the commencement of the reliability run** has the potential to generate enormous savings in avoiding liquidated damages for delay in contract completion, far exceeding the modest investment in the CEMData system. It also provides a valuable diagnostic tool for the display and archiving of data during this period.

CEMData includes as standard a powerful multi-channel digital storage oscilloscope which may be assigned from the Maintenance menu to any hard-wired analogue input, giving immediate on-screen display of hum, noise pick-up or instability affecting any channel from anywhere on the plant – and all without opening a single terminal box or connecting an instrument!



CEMData maintenance mode – 50Hz hum pick-up on an analogue input channel, displayed using CEMData’s built-in DSO

- **Data security using second hard disc, mirrored drive or RAID array.**
All data stored in tamper-resistant binary format and displayed using CEMData's own powerful drag-and drop graphical formatting package.
- **On-line support**
LOWE Engineering's **CEMData Plus** package includes dial-up support, trouble-shooting and configuration from our works by our own engineers.
- **Complete functional independence**
There is increasing demand for the emissions monitoring package to be independent of systems which handle day-to-day operational data and user adjustments. However, CEMData can receive data in a variety of formats from any instrument, from other computer packages or the DCS/SCADA system.
- **Reporting made easy**
CEMData's wide range of specialised functions have been developed specifically to facilitate the interpretation of arcane emissions legislation and site authorisations into unambiguous, clearly-defined reporting parameters. Each operation is comprehensively supported by an in-depth context-sensitive help utility, which includes technical notes, definitions and explanations. New features are added in response to user requirements.
- **Interpretation of digital status and fault signals**
One of the most important features of CEMData's unique design is the maintenance of a (potentially unlimited) list of application-defined FAULT conditions associated with each input signal. These are in turn transferred to all measurements calculated from one or more signals. Instrument faults, analyser-in-calibration, sample system faults, maintenance-in-progress or even plant operating conditions which would invalidate the signal are displayed on-screen in a format providing immediate indication of any non-valid measurement. All invalid measurements are excluded from reported emissions data. At a single mouse-click, reports may optionally show the number of valid data points contributing to each calculated value.
- **Exclusion alarms**
A related, but logically distinct facility is the provision of a user-defined exclusion alarm list. This is a list of conditions which the user may associate with any report template to exclude data reports generated using that template, whenever one or more of the defined conditions is true. It may for example be necessary to produce a report which excludes all data under certain plant operating conditions (e.g. "less than 6 hours at base load", "main stack bypassed", "abatement plant failure", etc.). The user may define an unlimited number of report templates, any of which may optionally include an exclusion alarm list.
- **Dynamic product support and development**
CEMData is an evolving package, to which new features are being added in response to customer demand. We aim to incorporate, test and configure custom-defined software features within the contract period of a new installation.

An emissions monitoring system should not be an afterthought. As part of our core business, each project receives dedicated, enthusiastic attention to detail from the moment of contract placement.

A leaflet cannot do justice to a complex interactive package - Call today for a demonstration of this remarkable product.