From: hht44@comcast.net

To: cindy.mulkey@dep.state.fl.us

Subject: Cement Plants - re telecon today

Date: Mon, 05 Dec 2005 18:15:15 +0000

Hello Cindy and Al,

Thanks very much for your time to discuss the Sumter Co. cement plant with me.
The article from Boulder is below.

Best regards,

Hans H Thiemann
1953 Lake Miona Dr.
Lady Lake, FL 32162

352 751 4286

Upset over Cemex plant

Facility ranks No. 6 for production "upsets" that violate emissions standards

By Todd Neff, Camera Staff Writer
December 4, 2005

On Nov. 1, a cloud of dust and exhaust billowed into the air above Cemex Inc.'s
cement plant near Lyons. Kiln maintenance was the cause, company officials said.

On Aug. 25, a motor jam gave rise to a similar cloud. The jam cut power to the
plant's kiln and other systems, including a massive fan that keeps air circulating
through the kiln and pollution-control systems.

The kiln's coal, boiling crushed limestone and other
ingredients of the 2-century-old recipe for Portland cement
at 3,300 degrees didn't much care what the issue was. It
burned on, pumping forth a plume of particulate matter and coal exhaust visible
for miles. It was obeying physical and, as it turns out, state and federal law in the
process.

Such production hiccups — known as "upset conditions" — are a part of doing
heavy-industrial business, and they're recognized by state and federal regulators
as an unfortunate part of complicated, high-volume production processes that
create the refined petroleum, steel, electricity and other commodities upon which a
modern economy depends.

Pollutants emitted in such upsets are noted on forms submitted to state regulators,
but not counted against permitted emissions of particulate matter, sulfur dioxide,
dioxins, heavy metals or various toxic compounds that cement-making can send
into the environment.

A Daily Camera study of Mexican-owned Cemex Inc.'s upsets since 1999 shows the
plant to have sent state regulators more upset reports than all but five industrial
facilities in the state. Cemex reported 99 upsets between January 1999 and Oct.
13 at its Lyons plant. Yet in light of data from selected cement plants in Colorado
and Texas, Cemex's rate of production upsets appears to be typical.

Of the 130 Colorado facilities reporting upsets during that period, 99 had 10 or
fewer, and 51 reported just one upset. Xcel Energy's Valmont Station east of
Boulder, with 35 upsets, was the 15th worst.

The state's most prolific reporter of upsets was Swiss-owned Holcim Inc.'s cement plant in Florence, which reported 375 upsets during the same period. Holcim and Cemex are the only two cement plants in Colorado.

It turns out that cement manufacturing is hard on hardware.

The business of cement

Cement is the glue in concrete. It makes up 10 percent to 15 percent of the manmade rock we drive and live on.

Making cement is a violent endeavor. At the Cemex plant near Lyons, crushed limestone rides in on a 2-mile conveyor belt from the company's Dowe Flats quarry. The rock is again crushed, mixed with sand or clay, iron ore and other materials, crushed yet again, and preheated to roughly 1,800 degrees, or about triple the melting point of lead.

It lands in the cement kiln, one of industry's most massive pieces of hardware. Wide enough to drive a sport utility vehicle through, more than half the length of a football field and sloping gently downward as it rotates, the kiln's temperatures peak at about 3,300 degrees.

The inputs melt into marble-sized globs called clinker. Clinker is mixed with a small amount of gypsum and other trace additives, ground finer than talcum powder, and shipped as cement.

This is truly a bulk process: Cemex Lyons' 100 employees produce 630,000 tons of cement a year, or 1,725 tons a day, company spokesman Rick Shapiro said. The company sells it as fast as they can make it, primarily to the Denver metro-area market.

Cement plants across the country are operating at full-tilt to keep up with demand driven by a combination of booming construction and the political hurdles associated with opening new cement plants. Shapiro said the Lyons plant runs between 89 percent and 95 percent of the hours in a year.

To produce a ton of cement, the kilns require the energy equivalent of 1,240 kilowatt hours, or as much as an average household uses in about 42 days, according to the cement industry group Portland Cement Association.

The association says there are 118 U.S. cement plants in 38 states, producing about $8.6 billion worth of cement annually. Cement prices have risen about 21 percent since October 2003, U.S. Bureau of Labor Statistics' producer price index data shows.

Portland Cement Association economist Tom Carter said the industry is projected to boost current annual U.S. capacity from 83 million tons to 103 million tons by 2010. Cement imports have climbed to 27 percent of U.S. consumption and show no sign of slowing.

Combine an aggressive production schedule with a mechanically brutal process and you have a recipe for breakdowns, which are evident across the cement industry.

Apples to apples

Combining Colorado cement-plant upset data with a sample of that posted online by the Texas Commission on Environmental Quality offers a means for comparison across the cement industry. Although state air-pollution laws vary, they tend to stick to federal guidelines for opacity, the pollutant mentioned in the vast majority of cement-plant upset reports in both Colorado and Texas.

The Holcim plant in Florence reported nearly three times as many upsets as Cemex in the 34 months from February 2003 to November 2005. But Holcim also

produces three times as much cement. Pound for pound, the Cemex plant had slightly more upsets per ton than Holcim in Florence.

Adjusted for volume, Cemex's plant in Odessa, Texas, had about four times as many upsets as either of the Colorado plants, and its New Braunfels, Texas, plant had 50 percent more upsets.

Cemex's Shapiro said the company could not comment on the variability in the number of upsets among its plants. In a statement, Cemex officials said, "The three cement manufacturing plants that you have requested information on ... are each operated in an environmentally compliant and sensitive manner. In addition, each of the plants you have referenced are plants that have historically operated well from an operational perspective, and continue to do so."

Raw upset numbers aren't everything. The duration of each of Cemex's reported upsets since 1999 was brief — almost all less than an hour, and often less than 15 minutes. In contrast, upsets at Holcim in Florence sometimes last for days. That was the case with an upset that began Nov. 23.

The event, caused by a clinker transport pan falling off its rails, led to an unknown degree of excess opacity for 90 hours, according to the report filed with the state.

Holcim spokesman Tom Chizmadia said the upset numbers in Florence reflect the breaking-in of a new plant, built in 2002 on the site of a predecessor half its size. He said the upsets represent 0.2 percent of total operating time.

Colorado upset data shows that in 2005, Holcim's upsets actually accounted for 2 percent of its operating time through November; Cemex's amounted to 0.1 percent. In terms of upset count, Holcim has had fewer this year, with 18 reports filed through Dec. 1. Cemex had 21.

Eric Schaeffer, former head of enforcement at the U.S. Environmental Protection Agency and now director of the Washington, D.C.-based Environmental Integrity Project, said the number of upsets at Cemex's Lyons plant didn't strike him as extreme.

"A typical power plant will run opacity exceedances 3 or 4 percent of the time," many times longer than what Cemex has reported, Schaeffer said.

But upsets sometimes offer hints of a deeper problem.

Upsets as warning signs

Jana Milford, senior scientist with Environmental Defense in Boulder, said upsets represent a compromise within the Clean Air Act.

In exchange for more stringent pollution limits during normal operations, plants are given leeway for unplanned problems.

"But when there are a lot of (upsets), you've got to start worrying about whether there is something significant going on, and about whether peoples' health is being affected," Milford said.

It is a state health department inspector's job to decide whether reported upsets are indeed unpredictable, and "not due to poor maintenance, improper or careless operations, or ... otherwise preventable through the exercise of reasonable care," as the department's Air Pollution Control Division's policy states.

Paul Carr, the state inspector assigned to Cemex's Lyons plant, takes note of upsets such as the one Cemex filed May 24. The event began at 12:29 p.m. May 23 and lasted 17 minutes. The reason for the upset, as Cemex officials stated on a faxed-in upset form: "Exceeded temperature on main baghouse when primary pump to spray tower failed. Backup pump was activated immediately."

Rather than "opacity," which describes the clouds of particulates often reported by the plant's neighbors, this one's pollution description box contained the letters "DF."

DF stands for dioxins and furans, carcinogens that cement kilns can emit in certain circumstances. In Cemex's case, so-called stack tests, which test emissions at varying temperatures, have shown that dioxins form if temperatures at pollution-control equipment intakes are above 517 degrees.

Even at 522 degrees, Cemex's load of dioxins and furans is more than 10,000 times below U.S. Environmental Protection Agency thresholds, said Pamela Milmoe, air and waste coordinator for Boulder County Public Health.

The state's subsequent investigation using Cemex's own data found that the Lyons plant violated the 517-degree temperature limit 72,067 times in 2004 alone, amounting to about 15 percent of its total operating time. Cemex could face civil penalties of up to $15,000 per day.

Cemex told state and county regulators Oct. 20 that the computer system monitoring dioxins and furans had malfunctioned, but other production data showed temperatures to have been below 517 degrees. The investigation is ongoing.

"It's not the individual upsets. It's when they indicate a larger problem," Milmoe said. "It's the morass we're unable to get out of with Cemex."

Environmental watchdogs say industrial companies sometimes exploit upset regulations to avoid shutdowns and make more money. Neil Carman, a former cement-plant inspector for the state of Texas and now clean-air program director for the Lone Star Chapter of the Sierra Club, contends that many upsets are "not legitimate."

"They are preventable if they do their proper maintenance and prevention work, but they don't want to shut the plant down because they're not making money when they shut down," Carman said. "Companies gamble like this all the time."

David Ouimette, manager of the stationary sources program for Colorado's Air Pollution Control Division, said state inspectors watch for such behavior.

"We look for patterns (in upsets), then we seriously question whether it's an unforeseeable breakdown of equipment," Ouimette said.

What's in the air?

Cemex's production upsets comprise a tiny fraction of its operating time. But the combination of the unknown nature of what is billowing into the air during an upset and Cemex's plans to resume tire burning has some residents concerned.

Ouimette said the specific toxins released in an upset are often unknown, particularly when the problem is reported simply as "opacity."

"Opacity is an indicator of a problem," he said. "The problem isn't opacity. It's whatever (the opacity) is made of, and we don't know what that is, generally."

Upsets can blow particulate matter, nitrogen oxides, sulfur dioxides and carbon monoxide out of the kiln without necessarily passing through pollution-control equipment, said Boulder County's Milmoe.

The Sierra Club contends that upsets generally bring higher pollution rates, and that agencies have not monitored the health effects of such emissions, according to Carman, the former inspector with the environmental group's Texas chapter.

"They just take a leap of faith," he said. "It's an issue all across the country and especially in Colorado."

Cemex's plans to burn tires for the first time since 1993 has some locals concerned about air quality. Two federal reports concluded that burned chipped tires posed "no public health hazard" at Cemex. But the agency did not consider emissions during upset conditions.

Burning tires as a supplement to coal is a widespread practice, and is already done at Holcim's Florence plant. But tires can produce more heavy metals and other toxins than coal.

Richard Cargill, who lives two miles east of the Lyons plant and leads the St. Vrain Valley Community Watchdogs, a group long critical of Cemex's operating record, opposes tire burning at the plant. He says the federal reports brush off the potential health impacts of upsets while burning tires because upsets are so infrequent.
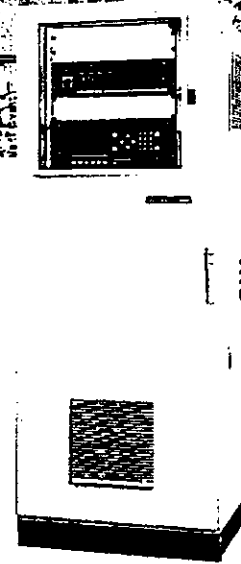
"But I'm still very curious about what could be released out there if there's an upset when they're burning tires," Cargill said.

Contact Camera Staff Writer Todd Neff at (303) 473-1327 or nefft@dailycamera.com.
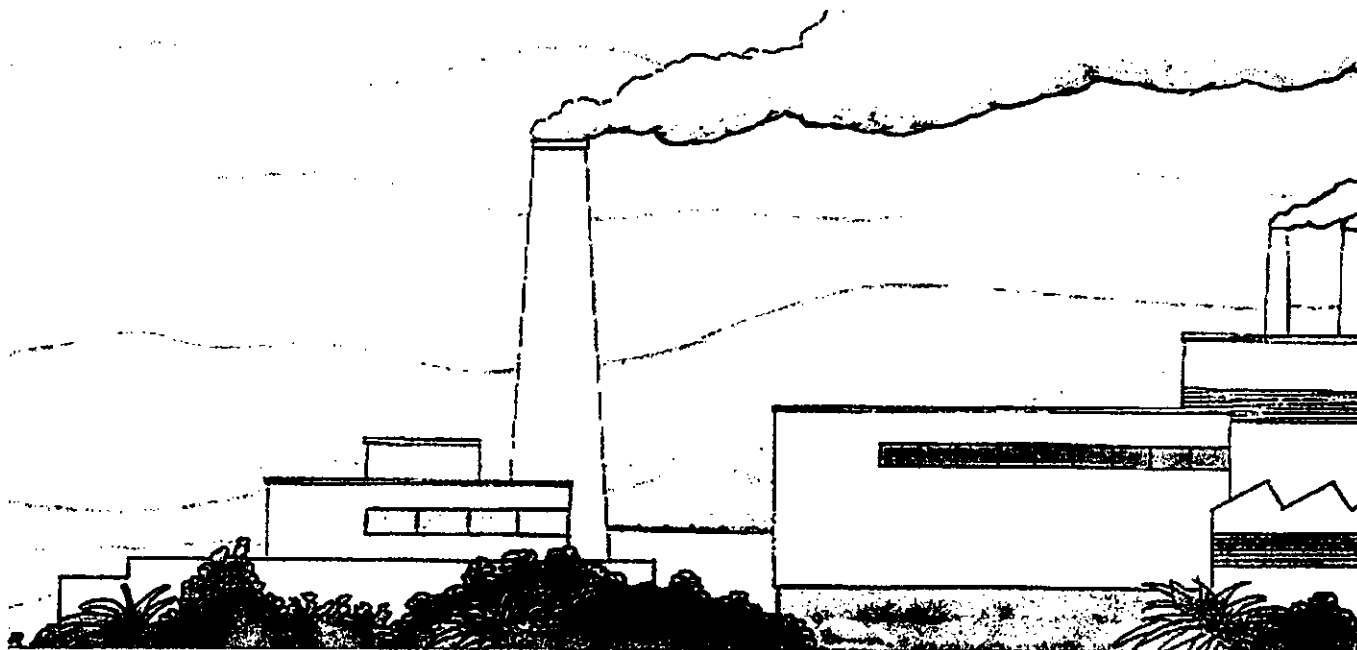
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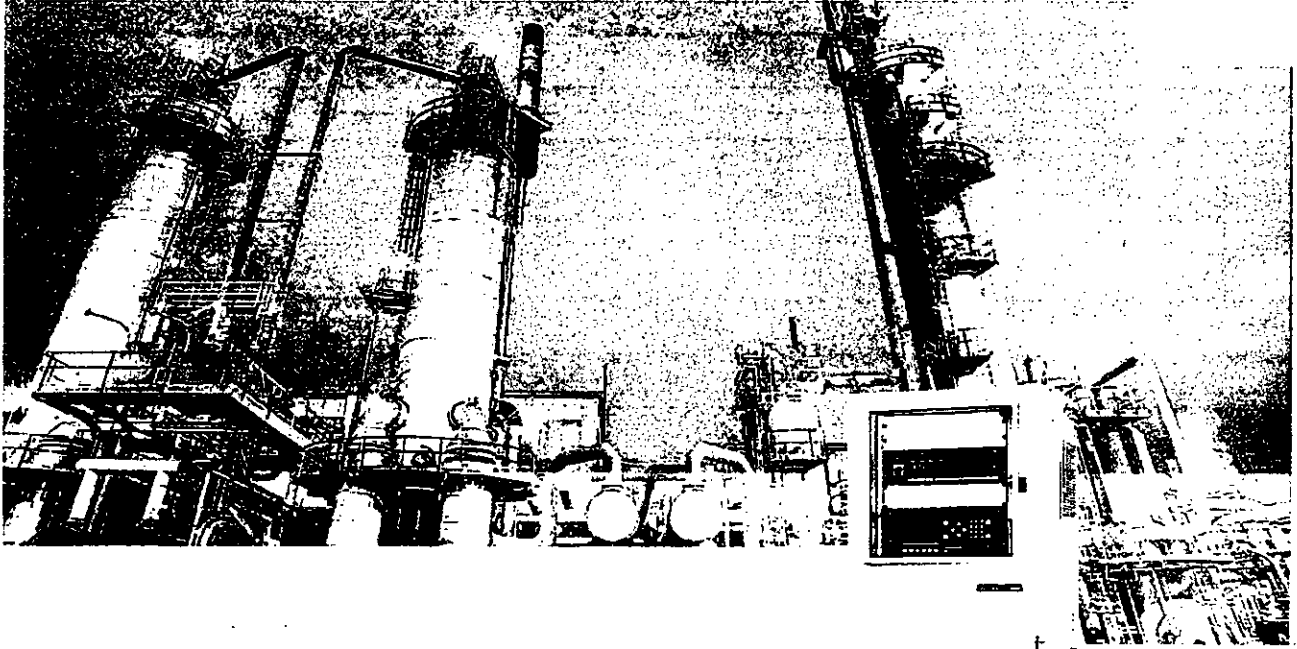
**Mercury Analyzer
for Flue Gases**

# Modern Measuring Technology
for Today's Requirements

Emission limits for many known pollutants have been reduced. Additional pollutants that have to be monitored are appearing almost daily. SICK, as the world's largest manufacturer of analytical instrumentation, has always been at the forefront of industrial measurement technology.

With the MERCEM system, SICK has introduced a mercury monitoring system onto the market that has been especially designed to meet the latest requirements of emission monitoring technology.

Continuous Mercury Emission Monitoring

Several national regulations stipulate an emission limit of mercury. The MERCEM Emission Monitoring System has been developed to monitor not only this concentration limit but also even smaller measurement ranges. MERCEM combines the advantages of proven SICK system technology with those of modern analytical techniques. In this way, even complicated analytical methods become accessible for continuous industrial emission monitoring.

Reliable Detection
of Mercury in Stack Gas
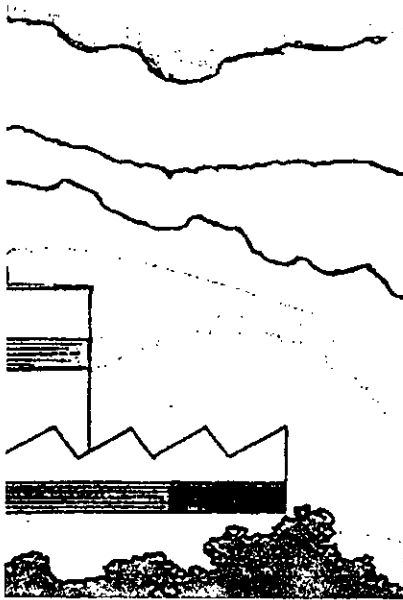
Among pollutant emissions, special regard must be paid to heavy metals because of their high toxicity. This is especially true for highly volatile mercury and its compounds. During combustion processes, such as in refuse incineration plants, mercury is mainly released as elemental mercury as well as mercury compounds. To record the total mercury emissions it is necessary to measure both components. Dust-bound mercury, however, plays only a minor part in the total emission.

Well-tested Reduction Method

To determine the total Hg-emissions in stack gas it is essential to reduce the mercury compounds to elemental mercury. For this purpose the MERCEM system utilizes the tin(II) chloride reduction technique – well-established for manual measurements.

Low Detection Limits

High detection sensitivities are achieved by means of a preconcentration step following reduction (amalgamation procedure). By varying the collection period the measurement range or the detection limit can be varied over a wide range to meet individual requirements.

No Interferences

The amalgamation procedure features an additional major advantage, i.e. that the Hg analyzer is never in direct contact with the stack gas. Thus interferences caused by other components in the stack gas are eliminated.

Minimized Memory Effects

Mercury chloride compounds, in particular, can cause strong memory effects during sample collection. MERCEM minimizes these effects by utilizing very high sample gas flowrates and high temperatures within the system components that are in contact with the sample.

Low Acquisition, Operating and Maintenance Costs

When developing the MERCEM, special attention was paid to creating a simple and reliable system. Low chemical consumption and minimal maintenance requirements result in economic operating costs. Simple connection to the proven SICK MCS 100 HW and MCS 100 E HW Multi-Component Emission Monitoring Systems allows MERCEM to be operated without the need for an individual sampling system and consequently reduces the acquisition costs.
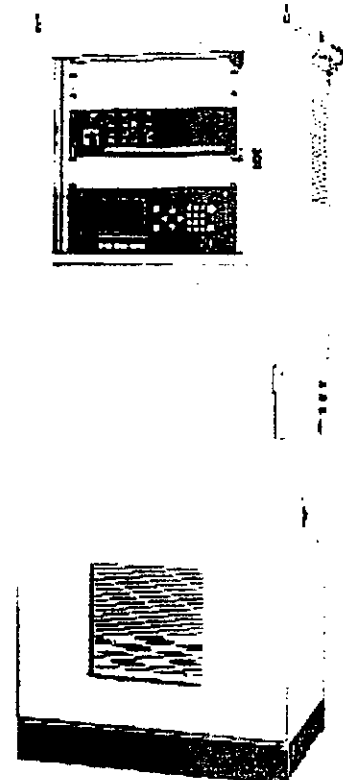
System Design

MERCEM comprises a system cabinet containing the sample gas transfer lines, analyzer unit with sample gas preparation assembly, and control unit. The MERCEM system can be used as a stand-alone unit with its own sampling device or it can be combined with an MCS 100 HW or MCS 100 E HW Multicomponent Emission Monitoring System.

Easy Handling and Accessibility

The ACE 100 control unit and the MFU heating controller are integrated as 19" slide-ins into the door of the system cabinet and are accessible via a separate transparent door. Consequently, the system can be operated without opening the system cabinet.
All components inside the cabinet can be easily accessed for maintenance purposes when the front door is open. The reservoir for the reductant solution is located directly behind the front door, making it very easy to replace.

Automatic Operation with Self-monitoring

MERCEM is designed for continuous operation with low maintenance requirements and contains all control units and self-check functions required for automatic operation. The temperature and flowrate of the sampling system are constantly monitored. Large intervals between maintenance are achieved by automatic flushing cycles.

In the event of a malfunction, the sampling system is switched automatically to the standby mode and is purged free of corrosive flue gas by an inert gas stream. Correct functioning of the sample gas preparation system, including monitoring of the filling level of the reductant solution reservoir, and the analyzer are automatically controlled.
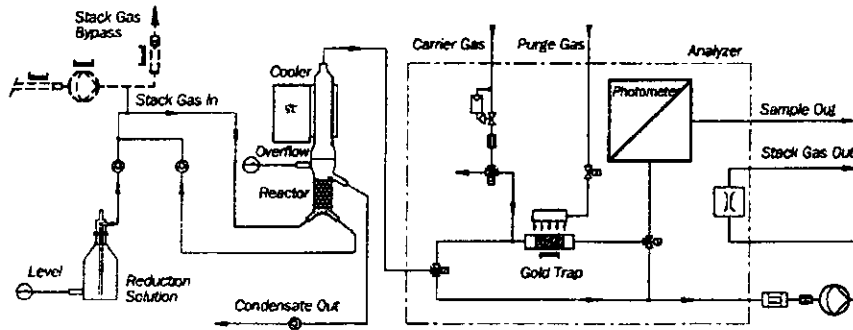
Safety

MERCEM meets the relevant guidelines for accident prevention and electromagnetic emissions.
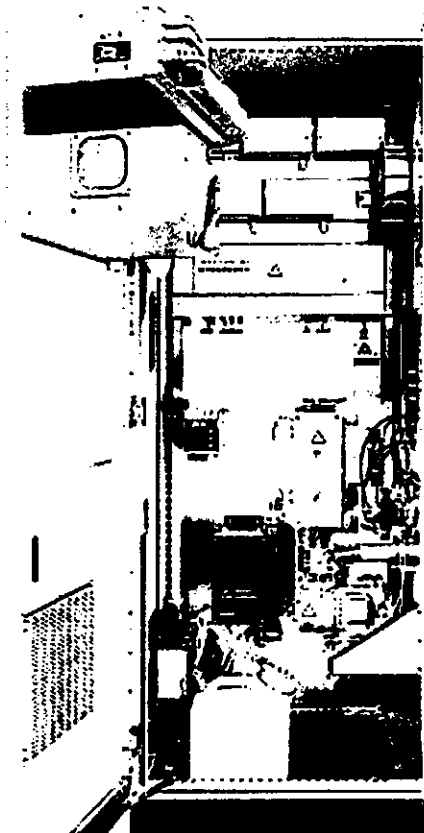
Inside view of MERCEM

Sample Preparation and Analysis

Flow chart

Gas Flowpath

The gas flowpath consists of
a strong bypass stream from
which a small partial stream is
extracted for sample prepara-
tion. The bypass stream is
produced by the built-in gas
transfer pump, or alternatively
via the MCS 100 HW resp.
MCS 100 E HW. Memory
effects in the sampling
system are minimized by the
high sample gas flowrate. A
second pump extracts the
partial stream and feeds it to
the reduction step and the
amalgamation unit. To avoid
condensation and memory
effects, all components up to
the reduction unit in contact
with the gas are electrically
heated to a high temperature.

Reduction

The reduction of mercury
chloride compounds into ele-
mental mercury is performed
by wet-chemical reduction
with SnCl$_2$ solution
within a reduction vessel.
Peristaltic pumps remove
excess condensate and feed
in fresh reductant solution.

Within a subsequent heat
exchanger the remaining con-
densate is removed and the
sample is thermostatted to a
constant dew point.
The sampling gas after pro-
cessing is conducted into the
gold trap.

Amalgamation

In the amalgamation pro-
cedure a precisely defined
volume of the sample gas is
conducted through a gold
trap, whereby the metallic
mercury forms an amalgam
with the gold. At the end of
this collection phase the gold
trap is heated electrically, the
mercury is released and
transported through the cell
of the photometer by an inert
carrier gas stream. Following
the purging cycle the gold
trap is cooled and is then
ready for the next collection
period.
The sensitivity of the system
can be adjusted to the
desired measurement range
by varying the sample collec-
tion time.
By utilizing the amalgamation
technique, interferences to

the measurement that can be
caused by other flue gas
components are avoided
since the analyzer is only in
contact with the carrier gas
and the mercury.

Photometric Measurement

The mercury is measured by
atomic absorption spectrome-
try. The single-beam pho-
tometer consists of a low
pressure Hg-discharge lamp
with high stability, a quartz
cell, and a photodiode
detector; the assembly is
thermostatted. High stability
of the measurements is
ensured by baseline correc-
tion automatically performed
before any measurement.
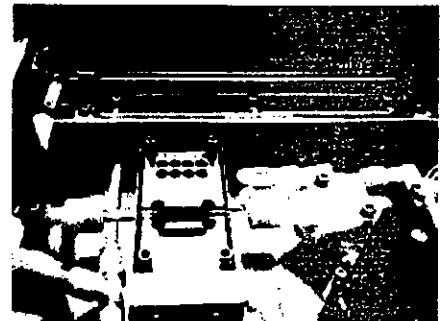
Gold trap and cell

The Sample Extraction System

The MERCEM sample extraction system is identical to that of the MCS 100 HW and MCS 100 E HW. It operates most reliably and has been designed for low memory effects. If MERCEM is operated in combination with an MCS 100 HW resp. MCS 100 E HW, no additional sampling system is required. The sampling system feeds the analytical system with a representative sample of the emission - cleaned from dust, but not changed in its chemical composition - with a suction capacity of approx. 1000 l/h. Additionally, calibration and security functions are integrated into the sampling system.

Adapted Probe Tubes

The probe tube is used to extract the flue gas sample from the stack and its length is adapted to the local circumstances. It is available as a heated or unheated version. If the stack gas temperatures exceed the dew point of the acid or the water vapor, probe tube heating may not be required. In this case a sintered metal filter is mounted at the probe tip for dust prefiltering. If the temperature is expected to drop below the condensation point, the sample must already be heated in the stack. For this purpose the electrically heated sampling tube is used. Dust prefiltering can then be carried out in the gas extraction filter. The latter is flanged to the stack and contains an additional fine filter element.

Automatic Backflush with Zero and Test Gas Sampling

Backflushing of the coarse filter as well as sampling of the zero or test gas are performed by means of nonreturn valves inside the gas sampling filter. Using this technique almost the complete sampling system is involved in the calibration, which significantly improves the reliability of mercury detection in the trace range. The connection to the sampling tube is closed by means of a pneumatic valve during the back flushing or the calibration procedures, respectively.

Sampling Line

The sample gas flows to the gas transfer pump via the sampling line. Normally, an electrically heated PTFE-line is used for this purpose. Depending on the length, the heating is divided into one or several control circuits. In the event of a malfunction the connection between the probe and the sampling line is closed by a pneumatic valve and the sampling system is purged with inert gas to avoid possible damage by corrosion.
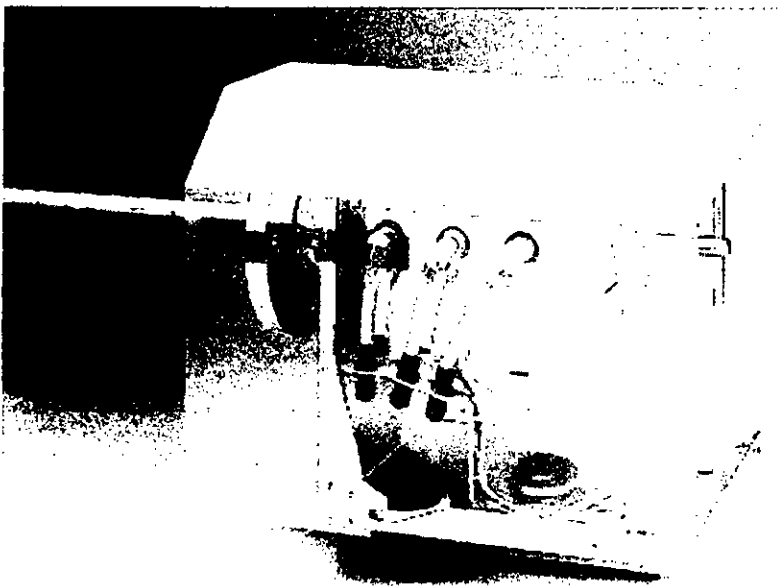
Sample Extraction System

System Control and Interfaces

MERCEM is controlled via the ACE 100 system control unit. The ACE 100 is an industry-PC with a user interface especially tailored to the requirements of industrial measuring technology and contains particularly interference-proof interfaces.

Easy-to-use Software: 2 Operating Levels with Password Protection

Operation of the MERCEM meets the requirements for modern measuring systems. The software is easy to use,

Interference-proof Interfaces, Automatic Change of Measurement Range

Data input and output are performed via fiber-optic controlled relay interfaces in the ACE 100. Analog outputs
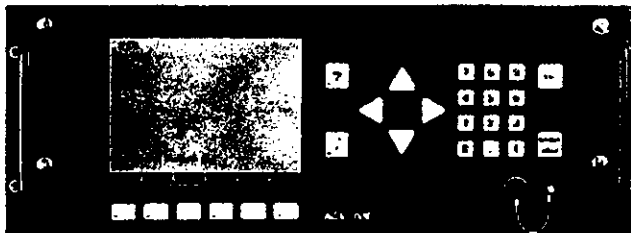
ACE 100 Control Unit

Integrated Data Acquisition System

ACE 100 is an IBM-compatible computer in a 19" slide-in cabinet with illuminated LC display and a special membrane keyboard. A silicon disk with no moving parts is used for mass storage.
ACE 100 controls the measurement sequence, calculates measured values, monitors limit values, and generates the results, warnings and alarms on the internal display and the opto-decoupled interfaces. Keyboard and display are mounted behind a lockable transparent door at the front of the system and are easily accessible. An external keyboard can be easily connected if required.

utilizing the cursor and function keys for menu selection. Two operating levels are available for the measurement mode and - password-protected - for changing control functions.

Display of Measured Values and Data Backup

Together with the status reports all measured values are displayed numerically, graphically, or as a concentration curve on the LC display. Via the integrated mass storage unit it is possible to retrace the graphical display as well as the status reports.

(0/4-20 mA), with automatic switch-over of the measurement range as an option, are generated at the interfaces as well as the status signals. Digital and analog values generated by instruments of other vendors can easily be read in and processed.

Fiber-optic controlled relay interfaces
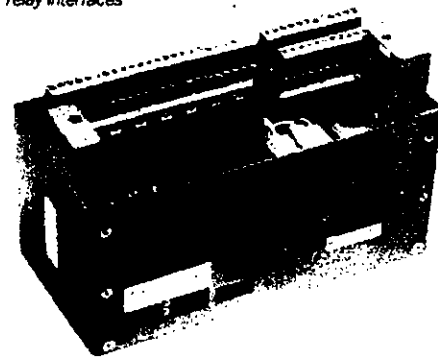
Technical Data   MERCEM

Dimensions:	2100 mm x 800 mm x 600 mm (HxWxD) (incl. 100 mm base)
Material:	steel sheet
Weight:	approx. 340 kg
Color:	RAL 7032 - grey -
Degree of protection:	IP 54
Ambient temperature:	+5 °C to +40 °C
Ambient humidity:	Up to 80 % (non condensing)
Power supply:	3~230 V +10 % / -15 % / 50 Hz, optional 3~115 V / 60 Hz
	(1 phase possible)
Power consumption:	
- Control electronics (ACE 100):	max. 360 VA
- Analyzer unit:	max. 2000 VA
- Heated tube:	max. 150 VA/m
- Fine filter:	max. 400 VA
- Heated gas sampling:	max. 350 VA (not necessary in combination with MCS 100 HW or MCS 100 E HW)
Measurement range:	0-100 $\mu g/m^3$ (smaller ranges on request)
Detection limit:	< 2 % of measurement range
Response time T_{90} :	approx. 180 s.
Cycle time of measurement:	< 180 s.
Zero drift:	< ±2 % / month
Span drift:	< ±2 % / month
Influence of temperature:	< 2 % of measurement range / 10 K
Linearization:	automatic after input of the calibration values
Limits:	two limits freely programmable as normally closed or normally
	open relay, automatic measurement range selection
Sensitivity control:	optional with Hg permeation system
Flow:	approx. 1000 l/h, analyzer unit: approx. 30 l/h
Auxiliary substances:	$SnCl_2$ reductant solution (consumption approx. 0.1 l/day),
	reservoir 10 l, inert gas (instrument air or N_2)
Sample point switching:	optional
Signal outputs:	galvanically separated via optocoupler
- Digital:	5 (optional max. 46), normally closed or normally
	open relays, freely assignable
	load: AC: max. 3000 VA / 250 V DC: max. 65 W / 230 V
- Analog:	8 (optional 24) 0/4-20 mA, max. resistance 500 Ohm
Interface:	RS232 (V24)
Inputs:	galvanically separated via optocoupler
- Digital:	12 (optional max. 72) freely assignable
- Analog:	6 (optional max. 32) freely assignable
Display:	7,4" monochrome LC Display with 640 x 480 pixel
Keyboard:	numeric membrane keyboard with cursor and function keys,
	external keyboard attachable
Operation:	2 levels, for user and programmer (password)
Memory:	2 MB (up to 32 MB optional) silicon disk
Standards:	IEC 1010-1
	EN 50 081-2:92 (Emission of conducted and radiated noise)
	EN 50 082-2:92 (Electromagnetic compatibility)
Maintenance interval:	4 weeks
Approval:	lowest measuring range according German TÜV: 0-100 $\mu g/m^3$ Hg,
	US EP