



# CSM Worldwide

## CSM Worldwide Announces Breakthrough in Testing Destruction Efficiency of CatOx Units in Commercial Bakeries

Thomas G. Otchy, President of CSM Worldwide recently sat with David Brady, CSM's Marketing Consultant to discuss a major contribution by CSM in testing technology for catalytic oxidizers in commercial bakeries.

**David:** So Tom, what's the big news about testing Catalytic Oxidizers in Bakeries?

**Tom:** We now have a fast, reliable, inexpensive technique for measuring the performance of catalytic oxidizers in bakery applications. Once a CatOx unit is installed, the bakery must verify to the authorities that the unit is performing as required. This has not always been an easy task.

**David:** How is a CatOx performance tested?

**Tom:** We must measure the non-methane hydrocarbons (NMHC) in the inlet to the CatOx and the NMHC in the outlet from the CatOx, determine by difference the NMHC removed and



Thomas G. Otchy President of CSM Worldwide

divide the removed amount by the amount entering, this gives the destruction removal efficiency (DRE) of the CatOx unit. Typically authorities require a DRE of 95%.

**David:** What technique is used today to make these measurements?

(Continued on Page 2)



**Tom:** Testing companies use a variety of methodologies, but they all have weaknesses. The most prevalent test protocol is Method 25A using a standard flame ionization detector (FID) to measure total hydrocarbons in a sample that is continually drawn from the operating unit through a heated sample line into the instrument. Simultaneously, during the one-hour test period, a sample is drawn into a Tedlar bag and afterward tested for methane by Method 18 using gas chromatography. The average methane value measured by Method 18 is subtracted from the continuous readings of total hydrocarbons from Method 25A to give the non-methane hydrocarbon value at that sample point.

**David:** What's wrong with Method 25A and 18?

**Tom:** The major problem with Method 25A and 18 is that the results are not live. The NMHC values are often not known for 1-2 weeks after the test. All too often, a test of a performing CatOx unit gives poor NMHC measurements due to errors in testing which are not discovered until weeks after the test is completed, requiring costly retesting, frustrated customers and skeptical authority representatives.

**David:** Why is this measurement difficult in a bakery?

**Tom:** Measuring NMHC in a bakery exhaust is one of the most difficult testing challenges. The major difficulty is that the exhaust contains 5-15% water vapor. The non-methane hydrocarbons are mostly ethanol, which is infinitely soluble in water, and is present in as much as 2,000 ppm in the CatOx inlet and as little as 10-50 ppm in the CatOx exhaust. Extreme care must be taken to avoid condensation during sampling and analysis; otherwise the condensed water will absorb ethanol and effect the NMHC reading.

**David:** Are there any other difficulties in testing using Methods 25A and 18?

**Tom:** Yes, and it has to do with accuracy due to errors introduced by the calculation involved. Let me explain. Methane is not a volatile organic compound (VOC) regulated by the authorities. It also does not react across a catalytic oxidizer. So, we subtract the methane from the total amount of hydrocarbon in the sample to give the NMHC measurement. In a bakery however, the amount of methane in the samples can be as high as 1500 ppm. In the CatOx exhaust, where small amounts of NMHC exist but high levels of methane are present, the small difference between the large numbers of total hydrocarbon and methane can introduce errors larger than the accuracy of either of the large numbers being measured. It is not uncommon to report negative

(Continued on Page3)

values for the NMHC for this reason.

**David:** So, what is CSM's new technique for testing CatOx units in bakeries?

**Tom:** Because CSM is the major supplier of catalytic oxidizers to industry, we decided last year to take on this challenge. In cooperation with JUM Inc., the preeminent supplier of FID instruments to industry, we have adapted, tested and applied a new type of FID to test bakery CatOx units. The class of instruments is called a "FID with a methane cutter".

Although there are a couple on the market we believe the JUM 109A instrument is the best for bakery applications. The JUM 109A is really two FID's in one box. The way it works is the sample is drawn continuously from the CatOx unit through a heated sample line into the instrument following Method 25A protocol. Inside the instrument, some of the sample goes to a FID to measure the total hydrocarbon in the sample. The rest of the sample goes to a special catalyst that destroys all hydrocarbons, but none of the methane; the sample then goes from the catalyst to a FID to measure the remaining methane. The instrument displays total hydrocarbon, methane and by difference, non-methane hydrocarbon. We finally have an instrument that gives continuous, live and reliable measurements of NMHC.

**David:** Makes sense, but does it work in practice?

What happens in a real bakery environment?

**Tom:** We, at CSM are now convinced that this is the best way to measure! There were some early failures by other instrument suppliers in their rush to market, but not by JUM. We have tested the instrument extensively at our facility before risking our reputation by introducing it to our customers. We presented a test protocol to the Pennsylvania DEP who have accepted this technique as a compliance test. For the Stroehmann's Bakery in West Hazleton, PA. Preliminary results from the compliance test showed not only that the CatOx unit performed to specification, but also the test was completed smoothly, with immediate comments to testing company, customer and authority onsite for the test.

**David:** Is the test technique only applicable to bakeries?

**Tom:** No. The same technique has been accepted by the authorities for tests in other industrial applications in Massachusetts, Maine and Rhode Island.

**David:** Looks like we have a new technique for testing CatOx units.

**Tom:** Yes. CSM is proud of making an important contribution and being of service to industry.

