C&M Lab 'detectives' uncover global solutions

Two chemists and an engineer huddle around a monitor in the Chemical and Metallurgical Laboratory (C&M Lab) at Kohler Co., attempting to solve a mystery. It isn't a whodunit, but a "whatdunit."

The C&M Lab staff includes, from left to right.
Row one:
(1) Shirley Lai
(2) Mary Jo Grabner
(3) Lisa Escher
(4) Laura Roszak
(5) Jerry Wilkinson

Row two:
(6) Jim Kellner
(7) Joan Deno
(8) Nancy Beier
(9) Salena Kuehlmann

Row three:
(10) Pam Schleicher
(11) Anne Sentowski
(12) Dave Kluz
(13) Jeff Schuessler
(14) John Multer
(15) Dick Klein

Row four:
(16) Debbie Wallace
(17) Donna Day
(18) Cay Schmitt
(19) Wally Scheele

Row five:
(20) Ron Stubbe
(21) Dennis Laack
(22) Ken Krause
(23) Terry Gottsacker
(24) Mitch Thuecks
(25) John Psihoyios

At left: Nancy Beier, Materials Technician I, operates the digital microscope while Donna Day, Senior Metallurgical Project Engineer looks on.

Together they view an image of the chrome- and nickel-plated faucet handle that is projected live onto the screen by a sophisticated digital camera mounted atop one of three microscopes. They examine the faucet for the richness of its luster and the durability of its finish after exposure to abrasive cleaners. The high-tech detective work conducted at the C&M Laboratory at Kohler Co. headquarters in Kohler, Wisconsin, is world class, and, indeed, the lab provides expert chemical, materials, and analytical testing to help improve product quality at Kohler's manufacturing locations around the globe.

The mysteries that the C&M Lab solves are generally about "being better." How, for instance, can we improve the aluminum casting process for our engines? Are our manufacturers using the best suppliers for enamel oxides and vitreous raw materials? How can the durability of the wiring on a piece of manufacturing equipment be enhanced?

Over time, the C&M Lab has built a respected reputation for its analytical capabilities, providing global

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C&M Lab

support to Kohler facilities by analyzing raw materials, by helping to improve their processes, and by providing technical problem-solving consultation and support.

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>
> – **Jorge Molina**, General Supervisor of Slip, Glaze and Lab – Kohler Saminex

Global sleuthing for raw materials

C&M Lab associates evaluate a broad range of raw materials, and also provide analyses for facilities considering changing raw materials sources.

"Let's say a manufacturing facility wants to change its vendor for oxides, which are used in making enamel glass," explains **Gerald A. Wilkinson**, Manager, C&M Lab. "We will visit the facility as well as the prospective vendor's mine source, collect samples and do a comparative analysis that will determine whether they meet Kohler standards."

Kohler Saminex, a vitreous manufacturing facility in Monterrey, Mexico, regularly sends slip, glaze and raw material samples in for analysis. "We send samples every month to have the lab check and detect any changes in composition," explains **Jorge Molina**, General Supervisor of Slip, Glaze and Lab. Recently, the facility had the lab compare samples from its current U.S. supplier with a Mexican supplier.

Results are available almost immediately. "The lab is incredibly responsive," adds Molina. "We get reports by E-mail and they are always very detailed and clear."

How is the lab able to respond so quickly to meet its customers' needs? Digital cameras for one, which are among a series of purchases that complete a three-year process that streamlined laboratory operations and thrust the lab fully into the digital world.

"Our move to an all-digital lab has made us more precise, accurate, and top-quality," says Wilkinson. "Plus, going digital really helps us save time."

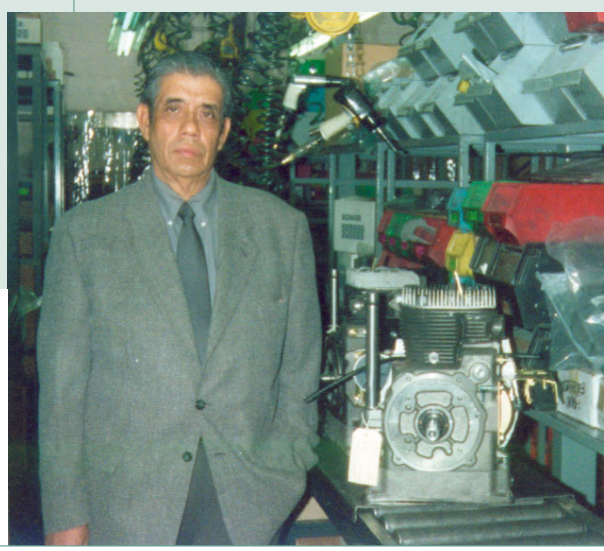
"Much of the problem solving starts at this microscope," says **Dennis Laack**, Supervisor, Analytical Services, standing at a stereomicroscope, a precision unit that magnifies images up to 60 times actual size and provides a 3-D image. Laack is joined at the monitor by **John Multer**, Senior Staff Chemist, and **Wally Scheele**, Senior Project Analyst, who are part of the team.

"With the digital equipment, we don't have to deal with Polaroid or 35mm photography anymore," says Scheele. "We can view magnified images on a screen before taking a picture, take as many pictures as we like, and pick and choose later which we want to archive or use in reports."

The stereomicroscope is a pre-screening tool. A sample might go next to the Zeiss universal microscope, capable of magnifying an object up to 1,500 times actual size. **Donna Day**, Senior Metallurgical Project Engineer, relies heavily on the Zeiss, which is also digitally equipped. "I'm getting better pictures faster," says Day. "I can set it up more easily and see what I'm going to get before taking the picture. And better pictures make it easier to do top-quality work."

Pam Schleicher, Project Analyst, operates the most sophisticated digitally equipped microscope in the lab, a Scanning Electron Microscope with x-ray analysis capability that was purchased in 2000. Samples are placed in a locked, vacuum-sealed chamber where electrons are used to create highly magnified 3-D images. It also electronically analyzes the sample and produces detailed printouts of the sample's various chemical element constituents.

Perhaps the biggest time savings are achieved at the beginning and the end of the process. Before the detailed analysis begins, macro photos of prod-



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>
> – **Fernando Quiñones**, Manufacturing Manager – Kohler de Mexico

ucts to be studied are taken to document their condition when received by the lab, a task for which **Terry Gottsacker**, Senior Project Analyst, has assembled a collection of digital cameras. "Because the film development step has been eliminated, we can be sure that we have a good photo in a matter of minutes," he says. "That saves hours or even a whole day."

The move to an all-digital lab has also significantly reduced the time required to generate lab reports. "Text, photos, and charts are embedded in an electronic file, which we can E-mail to our customers instantly," says **Cay Schmitt**, Area Associate II. "We used to compile all this by hand, but now it doesn't matter whether customers are across the street in Kohler or across the world in Paris or China — they receive the report in seconds. Our long-term goal is to eliminate paper reports completely. And we're very close to that."

Global process improvement

The C&M Lab also provides hands-on technical problem solving to help Kohler facilities and their suppliers improve their manufacturing processes. To accomplish this, the lab has extremely powerful technical and analytical capabilities at its disposal.

Recently, the C&M Lab worked with a supplier to improve its casting process so it could provide quality components to one of Kohler's businesses. "When we worked with the supplier, we not only were able to take our experience on the road," explains Wilkinson, "but we could air-freight samples back and use the lab's analytical capabilities to assess different materials and provide the supplier with feedback on what materials to use and identify defects in test castings."

Earlier this year, Kohler de Mexico, Kohler's small-engine manufacturing facility in Mexico City sent some of its engines to the C&M Lab for analysis to determine if it should use different materials to improve its product. The lab advised the plant to refine its manufacturing process, not change the materials. Explained **Fernando Quiñones**, Manufacturing Manager: "All along we believed we could improve our engines by using different materials, but the lab advised a manufacturing change. We accepted its recommendation — with very good results."

The lab also helped the Beijing, China, Kohler facility, which manufactures faucets, to refine its plating process. Although the facility boasts its own lab, it is not equipped to perform some of the most sophisticated tests, for example, the chemical tests for plating baths currently conducted by the C&M Lab in Kohler.

"We occasionally need to put our heads together to come up with solutions," reports **Zhang Jun Hui**, Deputy General Manager. "We can always count on the lab to offer excellent ideas."

The facility also seeks the advice from the C&M Lab before replacing or purchasing new testing and analytical equipment. "The lab is always able to provide us with information about pricing and its past experience with different vendors," says Zhang. "Recently, we consulted with it before replacing our metal analysis spectrometer and plating thickness tester."

What's next for the C&M Lab? For all of the lab's recent enhancements, it isn't content to rest on its laurels. "We'd like to become more involved earlier in the process with product design and process selection," says Wilkinson. "This is a design-oriented company, and we can help make our designers — and our products and our processes — even better."

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– **Zhang Jun Hui**,
Deputy General Manager – Kohler China

C&M Lab approved for accreditation

On August 10, 2001, the C&M Lab received notification of approval for accreditation by the American Association for Laboratory Accreditation (A2LA) in the chemical, environmental, and mechanical fields of testing. The accreditation is the culmination of more than three years effort to develop and implement the systems and practices necessary to be meet A2LA requirements, which are in compliance with ISO 17025. Credit for this achievement goes to the associates in the C&M Lab who work with passion and commitment to ensure that the data and results produced by the lab for Kohler Co. customers around the globe are of the highest integrity and most consistent quality.

The A2LA accreditation complements the lab's twelve years of Wisconsin Department of Natural Resources Certification for drinking water, waste water, and solid and hazardous waste. The C&M Lab is also an NSF- and UL-approved subcontract lab for performing faucet waterway certification in accordance with NSF 61 protocol.