



CUSTOM-FORMULATED INKS

CAN BE AN EASY WAY TO

MARK INFORMATION ON

REFRACTORIES AND OTHER

CERAMIC PRODUCTS.

THE

by Christine L. Grahl, Editor

Mark OF SUCCESS

Imagine this scenario: A glass manufacturer using your refractories in its melting process calls up your ceramic engineer. They're experiencing refractory failure, and they want you to fix the problem. The only trouble is, you can't identify for sure what is causing it. You can't track what day those refractories were shipped out, how they were fired or what raw material batch was used in their manufacture. How do you ensure that the refractories you're producing now don't have the same problem?

Marking the appropriate information on your refractory products can be an easy, inexpensive solution. Today's marking inks are formulated to withstand high temperatures and various application scenarios. Simply adding one small step to your manufacturing process now might save dozens of hours of backtracking and numerous customer service complaints down the road—ensuring a better, more efficient process in the future.

What Are Refractory Marking Inks?

Marking on refractories might sound simple enough, but numerous variables are involved to ensure that the mark stays in place and doesn't disintegrate during firing. "Because the refractory will be fired and used in a high-temperature environment, the marking has to withstand those temperatures. Most conventional markings would not work—they would just burn off," said Orville Steininger, owner of Innovative Ceramics Corp. in East Liverpool, Ohio. The company custom-formulates inks for refractory and other ceramic applications.

Some of the information needed to ensure the formulation of the "perfect" ink is firing temperature, application stage, pyrometric cone temperature and desired application method.

"Generally the marking gets put on while the product is in the green state and has to go through the full firing process without diffusing," said Steininger. "However, there has been at least one situation where the ink was put on after it was fired because the customer requested the marking. In that case, we had to make sure that the ink wasn't going to rub off before the refractory was installed in the customer's installation."



Also important is whether the manufacturer plans to stamp the product before or after glazing. The ink can be formulated to work with a glazed product if necessary.

Knowing what pyrometric cones your company fires to can also be valuable information for the ink formulator, although a good estimate can generally be obtained

from the firing temperatures and duration of the firing cycle. "A firing cycle of 24 hours versus a firing cycle of five days affects the formulation of the ink," said Steininger. "In a long firing period, the color can get burned out of the ink if it isn't formulated correctly. If it's fired onto a glazed product, the glaze acts like a flux, diffusing that mark over the duration of the firing cycle. If we know that an ink will be in a long firing cycle, we can formulate it to ensure that there is less diffusion over time."

Once all of the appropriate background information has been obtained, samples can be made and tested on the product. "We generally try to run about three different kinds of inks in a test so that if one ink doesn't work at a particular temperature, another one will," Steininger said. Ink formulation can take anywhere from one to six months, but is generally on the lower end. "Unless it's something really new to us, we can generally supply the ink within a month," Steininger said.

Applying the Inks

Cost is the biggest concern for most companies, but applying the marking inks can be as simple or as complicated as you want to make it. New Castle Refractories Co. in Massillon, Ohio, uses a paintbrush to manually mark its products; Ferro Corp. uses a manual stamp for some of its applications and automated screen-printing equipment for others; and another company has added a third firing process to apply a decal logo.

According to Steininger, the application process really depends on the company. Screen printing can be a fast, efficient way to apply a marking. "However, this method is also very expensive because of the type of equipment involved, and it should only be used on a large-run product to maintain the necessary quality level of the ink," said Steininger. Ferro, for instance, uses screen printing inks for spark plugs, where large quantity orders are produced on a regular basis.

Stamping is generally the application method of choice for smaller runs of larger products, but may not always be the best

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solution. The company that decided to try a decaled logo, for instance, had been previously stamping crucibles in the green state before the glaze was applied. Because the surface was curved, the marking often would not come out right and would have to be restamped, and many times the ink didn't show up after firing. Although using decals meant switching from a two-fire to a three-fire process, the results were worth the additional time and effort. "It was such a night-and-day difference," said Steininger. "The clarity of the marking drastically enhanced the overall look of their product."

Using the Inks

Quality control, product tracking and trademark identification are some of the most common reasons companies choose to mark their products.

One refractory manufacturer has a customer in France that requires it to mark its products so it can trace back through the entire process if there is a problem. A code is stamped on the products incorporating what batch of raw materials was used, what kiln it was fired in and what day it was fired. "Computers have made large quantities of data much easier to track and analyze, so marking products for quality control and data analysis makes sense. You can look back five years from now and quickly pull up all the information you need right in front of you," said Steininger.

Product tracking is another reason companies are starting to use marking inks. For instance, many different grades of brick produced at New Castle look similar when they come out of the kiln. "We mark on the brick with a paint brush before we put them in the tunnel kiln so that when they come out of the kiln, we know which grade they are," said Mike Helscher, company supervisor. New Castle also requires that its setters initial the brick on each kiln car so that if a problem arises from the way the brick were placed on the car, corrective action can be taken before too many cars have run through the kiln.

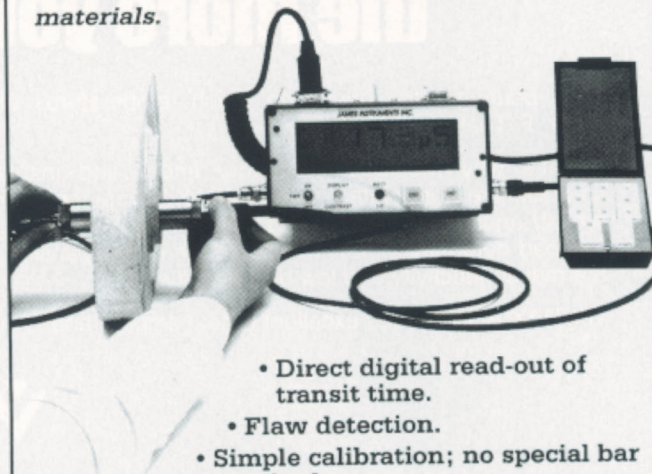
Ferro's Diamonite plant in Shreve, Ohio, manually stamps parts for engineered linings with reference numbers. Since many component pieces are made from larger pieces, they all need to be cut and assembled after they are fired. Each component piece is assigned an identification number on the original drawing, and those numbers are then stamped on the pieces so that they can be easily assembled after firing.

"Marking is simply an easy way to identify your product—for whatever reason," said Steininger. ☉

For more information about refractory marking inks, contact Orville Steininger, Innovative Ceramic Corp., 432 Walnut Street, Dept. 11, East Liverpool, OH 43920-3130; (330) 385-6515; fax (330) 385-6510; e-mail orv@raex.com. Or indicate number 206 on the Reader Action Card.

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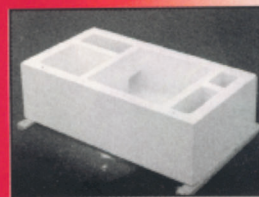
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