



FOUNDRY INSIGHT

Improving Performance in Production

February 2009

Volume 3, Issue 1

Pyrotek.info

ask the expert...

HAVING TROUBLE SOLVING YOUR FOUNDRY SCRAP ISSUES?



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In a recent publication, melt quality was listed as one of the most overlooked and misunderstood areas in today's foundry environment. Scrap identification plays a big part in this misunderstanding and can lead to frustration when looking to surmount melt quality hurdles. Pyrotek has a broad capability and a comprehensive range of technical support available to help determine the root cause of your scrap issues and make process-related improvements to positively influence your bottom line. Here, Mike Kamin*, Foundry Sales & Metallurgical Engineer based out of Pyrotek's Columbia City, USA facility, discusses some of the background and essential elements of scrap identification, and answers a series of questions commonly posed by customers.

Q: What is scrap identification?

A: Scrap identification is simply the route to properly diagnose your defect type with factual certainty. Very often, scrap reduction efforts are focused around the incorrect diagnosis of the actual defect type. In foundry environments, descriptive scrap terminology is used

interchangeably for a variety of defect types. Porosity is one that has been used to describe defects ranging from shrinkage porosity and gas porosity to oxide inclusions. It is very important to properly identify your scrap from the beginning.

Q: Why is scrap identification important?

A: Although this may seem trivial, Pyrotek finds that many foundries spend countless resources focusing on troubleshooting and problem-solving issues without understanding the defect up-front. It is important to use factual data from the very beginning to avoid wasting resources to investigate improperly diagnosed defects.

Q: How do I go about determining my defect types?

A: Pyrotek offers services that range from simple optical microscopy to more in-depth metallurgical analysis, using scanning electron microscopy (SEM) and different levels of image analysis. The company can offer factual information to diagnose even the most complex defect types.

Q: What does the scrap identification process look like?

A: The process of understanding melt quality can be broken down into several key steps listed below.

Step 1: Gather information.

Many influences come into play when considering root cause scrap analysis. The key point is that you must understand your particular casting defects to be effective in solving your problem areas. Gather as much information as

possible surrounding the origin of the defect in question. Ask operators, engineers, quality personnel, etc., as they are all central in the puzzle used in solving the issue at hand. Ask all the questions and leave no stone unturned since answers to support resolution of problems may be found in the most unusual places. It is also important at this time to set realistic goals (scrap reduction from 4% to 2% for example) and brainstorm possible root causes based on your cross functional team.

Step 2: Collect representative samples.

It is very important to have a good, representative sample of your defect type. Closely evaluate the suspected root cause and try to collect a wide variety of samples, which illustrate the spectrum of variation in defect types. Carefully note the conditions in which these samples were collected, as it may be valuable in subsequent problem solving.

Step 3: Use the available tools to properly assess your defect type.

As previously mentioned, there are many tools available to assist in scrap defect identification. Sometimes, simple magnified optical evaluation is suitable but most often carefully prepared samples and high-powered microscopes are needed. These tools can also be used to gain a wide variety of information ranging from elemental data to useful data on solidification kinetics.

Step 4: Use factual data to drive your quality improvement efforts.

Using the data gathered from Step 3 is

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vital in making your scrap reduction efforts a success. Implement a group of your personnel to work on problem resolution based on facts rather than just opinion or emotion.

Step 5: Substantiate.

Once problem resolution has been incorporated, based on your factual information, be sure to substantiate and document the results.

Q: What can Pyrotek do to help me with my melt quality improvement efforts?

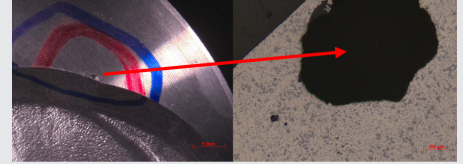
A: Pyrotek can get involved at any level of your scrap reduction efforts. The company has found it most beneficial to get involved in the initial meetings as our experience around the world can be used to help you identify potential problem areas. It also provides you with an outside, objective viewpoint, which can often be beneficial and effective.

Pyrotek can then work with you to set and evaluate goals, collect samples and information, analyse the samples, carry out fact-based improvement ideas and substantiate the results.

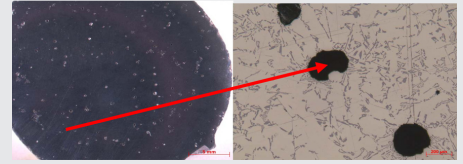
Q: How can I get started?

A: Talk to your local Pyrotek sales engineer or visit www.pyrotek.info to locate details of your needs. With coordination of our global resources, we will be able to help you understand your scrap reduction challenges and implement value-added changes.

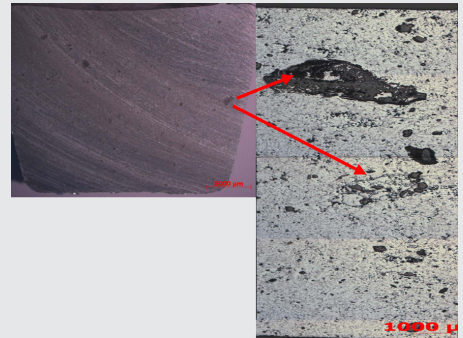
THREE TYPICAL DEFECT TYPES FOUND IN ALUMINIUM CASTINGS



Gas Porosity: Spherical Morphology



Shrinkage Porosity: Interdendritic Morphology



** Mike Kamin holds a Degree in Material Science and Metallurgical Engineering from Michigan Technological University, USA. He has worked in the hot metal industry for nearly 10 years and is part of the Pyrotek melt quality team with a particular focus on molten metal treatment including melting, transfer, cleaning and casting.*