

9 Benefits of a Thermal Analysis System for Foundries

90% of manufactured durable goods and practically all manufacturing machinery use metal castings. Producing them more efficiently and in less time would be a major benefit for foundries.

One way to do this is by using a thermal analysis system.

Thermal analysis instruments are typically used to monitor temperature and analyze chemical composition within molten metal, which can help increase melt capacity without sacrificing quality.

This article will discuss what a thermal analysis system is and some of the benefits foundries experience when they use it.

Let's look at what a thermal analysis system is and why you may want to invest in one.

What Is a Thermal Analysis System?

A thermal analysis system is a four-component instrument that has been used in the metal foundry industry for decades.

It is comprised of a temperature recorder, a pyrometer controller, a furnace with a temperature sensor, and a torch or probe with a temperature sensor.

How Does It Work?

Today's thermal analysis instruments work by measuring the temperature and chemical composition of a material.

They can be used in molten metal to measure temperatures and analyze chemistry, which helps to increase the melt capacity.

This reduces waste and allows for corrections that improve overall melt quality.

Benefits of a Thermal Analysis System for Foundries

Here are nine of the most significant advantages foundries get from utilizing a thermal analysis system.

1. Provides Accurate Temperature Readings

To ensure the quality of the completed product, it is necessary to maintain a constant temperature throughout a pour.

If the molten metal is excessively hot, it will alter the chemical and physical properties of the alloy, making it unable to fulfill required standards.

If the temperature is too low, solidification will prevent the molten metal from filling all of the cavities and apertures of the mold.

The heating mantle built into the thermal analysis instrument allows for precise temperature readings.

2. Eliminates the Need for Manual Readings

Manual readings can be eliminated with a thermal analysis system.

This can be an important benefit because it allows workers to focus on other, more important things.

It may also mean fewer mistakes and less fatigue for the workers who are responsible for recording the data.

3. Optimizes the Melting Process

The melting capacity is the most significant cost for foundries since it restricts output.

Thermal analysis equipment can be used to discover faults with the melt. It may reveal if additional ingredients are required to balance carbon, silicon, or other elements.

Corrections can then be made based on the data obtained, which will improve the overall melt quality.

4. Decreases Scrap

One of the main reasons many foundries scrap their metal is because they aren't in control of the chemistry.

By optimizing the melting process and increasing the quality levels through the use of thermal analysis instruments there is less scrap to throw out.

5. A Thermal Analysis System is Cost-Effective

In the long term, a thermal analysis system is cost-effective.

It doesn't just help reduce scrap and improve melt quality, but it also allows for a reduction in labor costs.

The time it takes to find issues with the melt can be cut down significantly when using a thermal analysis instrument, which frees up employees to work on other tasks.

6. Using a Thermal Analysis System Is More Chemically Accurate than Manual Methods

Manual methods for evaluating the chemistry of melts are often inaccurate or take too long to be practical.

The use of thermal analysis instruments means you're able to gather more data, which provides a better idea of what adjustments need to be made to the melt to improve burnout or tapping consistency.

7. Stabilizes Production for Low-Quality Foundries

Even low-quality foundries can benefit from using a thermal analysis system.

These low-quality foundries don't use specialized chemistry and frequently acquire iron and steel from junkyards. They also operate without a spectrometer lab and use inexpensive cupola melting.

The color of the slag is used to assess their quality control in carbon. They also do not check for silicon, manganese, chromium, copper, or other metals.

Using a thermal analysis system in these instances can help them to avoid losing their entire melt because of unusable chemistry.

8. Controls Silicon and Carbon in Moderate-Quality Foundries

Moderate-quality foundries are more advanced than low-quality ones, but still don't have a lab. The material they use is limited to known scrap.

These foundries use electric melting or cupola melting.

Because of the procedures they have in place, they seldom encounter problems with uncontrolled manganese, chromium, or copper.

Thermal analysis instruments can help control silicon and carbon in these foundries.

9. Boosts Production for High-Quality Foundries

High-quality foundries use cupola melting and control their chemistry by means of a lab.

Melting is done in an electric furnace, but the alloy is controlled through the spectrometer lab with combustion analysis.

This type of foundry uses all scrap metal and has a wide range of metallurgical knowledge and experience.

In order to pass quality control, the iron's chemistry must adhere to strict standards.

This adds a production time of [10-15 minutes](#), causing a delay in the melt cycle and having to wait for lab results. With the high-powered, medium-frequency melting furnaces, this delay can cause a [20 -25% lost melt capacity](#).

If the carbide stabilizers are consistent from heat to heat, thermal analysis equipment can be used to analyze carbon and silicon. This will speed up the lab process and decrease production time.

Create a Higher Quality Product in Less Time

By optimizing the melting process and increasing the quality levels through the use of thermal analysis instruments there is less scrap to throw out - which saves both time and money.

In addition, using a thermal analysis system provides more accurate data than manual methods, which allows for better melt control and increased production rates.

For more information about thermal analysis systems, subscribe to our blog.