

Why To & How To— Clean Your Furnace



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ARTICLE TAKEAWAYS:

- Furnace cleaning is a necessary investment
- Skimping on doing it the right way will cost you
- If you measure it, you can improve it

There is a stigma in the foundry business that cleaning your furnace should make you the star of the show “Dirty Jobs.” It’s not fun, it’s always hot and it can indeed be dirty!

It may also be that there are few things more important than keeping your furnace clean as it relates to your operation’s profitability. So, let’s take a closer look, not only at the “how to,” but at the “why to” clean your furnace and your furnace wells regularly. We will see that there are some aspects of this that will certainly vary from foundry to foundry, but in all cases, there are principles that will drive improvement in your business performance if you adhere to them. Your two largest costs in this business are raw material and energy. Good cleaning practices will provide a significant increase in throughput while reducing the energy required. These outcomes can be measured and will correlate directly with your income statement each month.

What might be different, and what is the same

In every foundry environment, there are different factors that will impact the operational performance, and there are principles that when followed will always result in improvement. Some of the primary factors include:

1. Raw material you are melting
2. Metal temperature
3. Amount of flow generated from your circulation pump
4. Burner size and positioning
5. Furnace configuration and dimensions
6. Metal depth in the furnace
7. Flux types
8. Refractory material

This is not an exhaustive list, but enough to demonstrate that no

two furnace environments are the same and so outcomes will always vary. That said, attention to basic principles will yield significant improvements. We all know that what we don’t measure, we can’t improve. Specifically, if we measure gas usage, dross weight, and furnace throughput, we can drive significant operational performance improvements that will increase profitability.

When to clean your furnace and how to do it

There is a best practice in the industry that requires cleaning your charge and pump wells once per shift, every shift, every day. This forces a practice that has every operator owning the process on their shift and avoids having this “burden” fall only on certain people on certain shifts, which will all but ensure it doesn’t get done. It also prevents having dross build up to the point that it becomes much more difficult to manage further lessening the likelihood that it gets done and eventually causing premature breakage of pump parts and reduced operational performance. Like so many manufacturing best practices, it takes discipline and leadership by example. If you then help your employees see the link between doing the cleaning frequently and the improved performance it produces, they will want to do it. People want to feel like they are making a positive impact on the operation, and this is a great way to do it. Consider adding a visual measure

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SIMPLE SOLUTIONS THAT WORK!

(a whiteboard or flatscreen) for furnace cleaning just the way you might for tracking machine rates. In my experience you can't underestimate how much this can positively impact performance.

Training, Cleaning & Tools

The best way to do this is to first provide the training that is required whenever you want something done to a standard. The second key is to provide the necessary tools so that what can be a difficult task is made as easy as is possible. If you don't make these two investments up front, you won't get the full benefit from the practice. Having the skimming and cleaning rods that are sized and shaped for your wells, pumps and archways will make these tasks much easier for operators. Here are some actual cleaning instructions from those we see adhere to best practices. Start

with the charge well, then move to the main chamber and archways and finish with the pump well. Plan to do your cleaning when the furnace is 75% - 100% full, and the circulation pump is off. For cleaning the pump well with the circulation and Launder Transfer Pump, turn off the circulation pump, using a 7" & 10" slotted ladle spoon, clean the pump posts with an upward motion, clean the shaft the same way, clean the wall sides and skim the top. On the Launder Transfer Pump do the same with the pump and use a smaller slotted spoon to clean up the metal line around the insert. After every Launder Transfer Pump transfer, clean out the launder trough. Turn back on the Circulation Pump. When the pump is out of the well, check and clean the pump well floor before the pump goes back in. Do normal cleaning on the main well

by dragging the bottom sludge away from the pump well arches with the Circulation pump off. Take a long spoon and make sure the openings are clean. Clean the main bath side walls at the metal line as best you can and skim the top of the bath. Then turn on the Circulation pump.

At the core, these practices reflect the type of manufacturing discipline that leads to better performance. We want to make things repeatable and be sure they can be done by all the team members. The specifics of exactly what you do, when and how, will be developed by your team as they find ways to build upon these best practices. If you partner this with measuring your key process drivers, in this case gas usage, dross creation, and furnace throughput, it will yield improved outcomes.





Lo Barato Sale Caro

As this magazine is distributed in both English and Spanish, we'll borrow a saying from our Mexican foundry friends. In English, it would be, "What you buy cheap ends up costing you dearly." All of us are driven to reduce costs and buy wisely, and that is a good practice. When we choose instead to compromise quality for price, we generally suffer. One of the areas this has a big impact in our furnace operations is with refractory materials. In our business of supplying pumps to the market, we see firsthand what can happen when installs or re-linings are not done to a high-quality standard. In all cases it leads to diminished performance and a domino effect of negative outcomes, and in some cases it can be catastrophic. I mentioned this in my last article, and I know

it runs counter to the way we often look at our operations but addressing refractory issues before they fail is going to yield a much better outcome than waiting until it is too late.

Your furnace is your most important profit generating asset, and it is a system that requires all its elements to be functioning at the expected level of performance to deliver. Here again, you can measure and keep records that will better allow you to maximize what you can generate. Coupling this with a preventative maintenance program focusing on the system and the interrelationships between the elements is the key to seeing improved performance.

"Why to" drives "How to"

Starting with the "why to" is fundamental to then determining "how to" best drive outcomes for

your operation. We know that in general, circulating a furnace will generate a 25 - 35% reduction in energy cost, and so there is a strong rationale for why to do this. To get the maximum benefit from circulation, you have to maintain the system so that it can deliver these savings 24/7/365. Starting with the investment in your team and what they will need to do this consistently (training and tools) pays huge dividends. Following some of the suggested steps we've shared and making cleaning a core part of your operation will allow you to develop this into a core competency that can differentiate you in the marketplace and significantly improve your bottom line.




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