

CAST HOUSE TECHNOLOGY

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BILLET CASTERS IMPROVE QUALITY, REDUCE HYDROGEN AND ELIMINATE CHLORINE

Cast houses around the world are using fused refining agents, based on magnesium chloride, as an effective means of achieving lower hydrogen levels and higher metal quality with minimal emissions. A complete range of molten metal treatment systems are available today to help the cast houses improve molten metal cleanliness, reduce alkali content, reduce emissions and decrease dross, without the use of chlorine.



Promag RI Fused Refining Agent

Refining Agents

Promag RI is a fused refining agent that is a composite of magnesium and potassium salt in a granular form. It is less hygroscopic than powders (as a result less likely to accumulate moisture) and is ideal for injection below the surface of the melt.

The benefits of properly introduced refining agents are well documented. Hydrogen levels are significantly reduced and alkali metals are removed (sodium, calcium, lithium) with sodium levels of less than 3 ppm attainable. Chlorine use is reduced or eliminated (depending on the system). Metal cleanliness is improved and some furnace cleaning takes place as part of the process.

Flux Injection System Dries the Dross

There are a variety of flux injectors available to inject refining agents. The newest is the FIF-50 automated injection system that utilizes argon gas as a delivery system. This mobile, efficient, easy to operate machine injects argon, Promag RI refining agent, and fluxes without the use of chlorine.

Injecting below the bath surface improves furnace homogenization and reduces the amount of refining agent required. By directly injecting the refining agent into the bath through a steel wand, the Promag RI has a longer reaction time, superior inclusions removal and improved hydrogen degassing efficiencies versus throwing bags onto the surface of the melt. Injection eliminates burn off of the refining agent on the surface of the metal dramatically reducing stack emissions. Promag RI reduces Al and Mg entrapment in the dross reducing metal losses accordingly. A computerized control panel allows for different pre-programmed settings for injection



Reaction and Degassing in Furnace



FIF-50 Automated Injection System

times and refining agent quantities. It also maintains a usage log for process documentation.

Reduced Costs/Better Quality

Improved treatment efficiency, reduced calcium and sodium levels and improved cycle times all add to the bottom line. Improved billet quality results in reduced die wear and extrusion scrap. This is something that every extruder is striving to optimize in order to maximize both margins and customer satisfaction with finished products.

See a
"Case-In-Point"
on the
reverse side.

FLORIDA EXTRUDERS ELIMINATES THE USE OF CHLORINE, WHILE IMPROVING PROCESS TIME, AND HYDROGEN/CALCIUM REMOVAL

Florida Extruders Inc., an aluminum billet producer for the building products market, needed to develop an alternative treatment to bi-gas fluxing using gaseous chlorine at their Sanford, Florida plant.

The Challenge

To replace the existing bi-gas wand process without a drop in quality or an increase to total costs. Hydrogen levels were selected as measurement criteria for success. The hydrogen levels of any new process had to be equal to or better than the current process.

Hydrogen levels were to be monitored continuously throughout the furnace cycle using the Bomem AlScan Hydrogen Analyzer.



The Solution

Pyrotek Inc., was asked to work with the plant team to provide an innovative solution to this environmentally sensitive problem. The goal was to select the proper fused refining agent coupled with the right injection system that would be compatible with their furnace size, melting process and quality requirements.

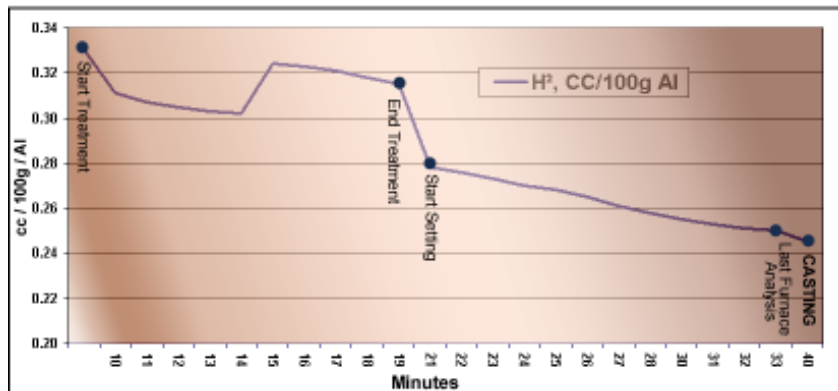
The FIF-50 Zendox SF injection system was selected by Pyrotek Inc. based on Florida Extruders requirements for an effective, affordable, mobile injector, that was low maintenance and programmable. In-plant service and technical support were also a factor in the selection. Zendox SF was selected as the treating agent. It reacts quickly to remove alkali metals, has very low emissions, reduces treatment times and combined with the FIF-50 automated injector, eliminates the need for chlorine. Zendox SF and Promag RI are Pyrotek's registered trademarks for fused refining agents. Zendox SF is manufactured in US and Promag in the European Community.

The Results

The Pyrotek solution was more efficient. The FIF-50 system was 25.8% efficient vs the bi-gas cycle using a mixture of nitrogen and chlorine which was 20% efficient. Below is a summary of the two systems:

	FLORIDA EXTRUDER'S CURRENT DEGASSING TREATMENT	PYROTEK'S RECOMMENDED TREATMENT WITH THE FIF-50
Process Time	30-40 minutes	25 minutes
Method	One steel flux wand (through furnace front door)	One steel flux wand (through furnace front door)
Reagent	Bi-gas with 50% nitrogen and 50% chlorine	30 pounds of ZENDOX SF
Delivery gas	N/A	Argon at 80 PSIG @ 80 SCFH
Hydrogen Efficiency	20%	25.8%
Post Time Treatment	0 minutes	20 minutes

Hydrogen Alscan Measurements at Florida Extruders (August 2001)



Summary

The injection of a fused refining agent, with argon used as a transport gas, can efficiently remove hydrogen and alkali metals from aluminum melts. The FIF-50 Zendox SF system can efficiently and economically replace bi-gas wand furnace fluxing and eliminate the use of chlorine.

For a complete detailed copy of the case study e-mail: getinfo@pyrotek-inc.com.

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