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Clean Metal: It All Starts Here!

When investigating the most efficient methods for cleaning molten aluminum, rotary flux injection will come back as the ultimate solution. Originally, degassing via lance was an acceptable method for preparing molten aluminum for casting. However, it was soon learned that rotary degassing can create an even more efficient cleaning process that would improve metal quality and reduce cycle time when compared to lance degassing. The next step forward was to incorporate flux into the gas stream to couple the cleaning benefits of the inert gas such as Argon or Nitrogen with the cleaning power of fluxes.

Outlined below are treatment times that are commonplace in job shops today:

Treatment Process	Parameters	Treatment Time
Lance Degassing	Flow rate – ‘whatever looks good’ bubbling	45 + min
Rotary Degassing (Ar or N)	Gas Press. ~12psi, Flow ~30 LPM, RPM ~300	15+ min
Rotary Flux Injection (Ar or N)	Same as Rotary Degassing. Addition of 0.5 – 1.0 lbs of flux during treatment	6-8 min

Table 1: Aluminum 356 in 1000 lb crucible or transfer ladle at 1380° Fahrenheit. A specific gravity of 2.60 or better was the result.

Many foundries add flux manually to the surface during the degassing cycle in an effort to clean the metal further and reduce dross weights. While this is an effective way to dry out dross it does not clean the metal as effectively as injecting during the degassing cycle. Injecting allows less flux to be used to achieve even better quality, which is the result of a more efficient reaction between the metal and the flux. Also, since the flux is being added subsurface the amount of smoke given off is greatly reduced, which is beneficial to the operator and the environment. *(It is the author’s experience that even the pickiest Environmental Agencies allow rotary flux injection without special permitting.)*

The most obvious benefits of injecting flux into the metal via the gas stream are reduced cycle times, improved metal quality and drier dross, but the savings and benefits do not stop there. While the primary goal of flux injection is to prepare the metal for casting, the fringe benefits include; lower pouring temperatures; less scrap in casting, machining and finishing; improved mechanical properties; higher metal yield; cleaner furnaces, ladles and pots and the ability to pour more complex castings.

To summarize, the benefits of flux injection are many. With the reliability of the equipment available today coupled with the many different designs to fit the custom needs of your foundry, schedule your trial today!

About the Author: Nate Wollenburg received his B.S. in Material Science and Engineering from THE Ohio State University in 2004. Formerly serving as Product Specialist for Non-Ferrous Metal Treatment and Account Manager for Foseco he has been with Wedron Flux for the last two years as a Sales Engineer.

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