MetalTek INTERNATIONAL
BECAUSE YOU DEMAND MORE THAN METAL

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Tek Bulletin

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Metals Trivia:

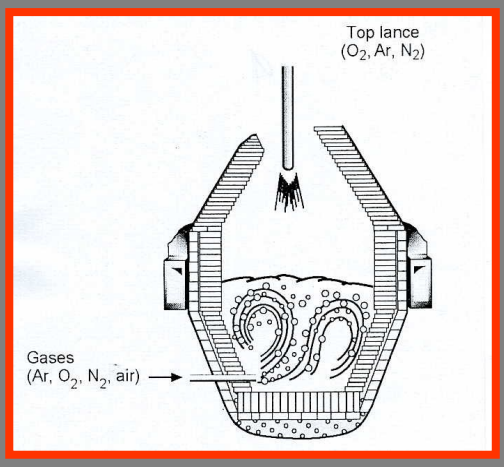
- Gold, platinum, and palladium do not readily oxidize at room temperature. That makes them useful for high end electrical components, etc.
- The Hall-Haroult process for aluminum was discovered in the 1880's. At that time, aluminum sold for the same price per pound as silver..
- Wide rolling mills saved the steel industry in the Depression. The wider size was used by automobile designers to produce full-width hoods, trunks, and roofs for the new designs of the 1930's.
- King Tut's tomb included iron tools and implements from 1350 B.C., including a welded iron pillow...probably made without welder qualifications.

Have a Metals problem?
Call Us 1-262-650-7171
www.MetalTek.com

ARGON OXYGEN DECARBURIZATION (AOD)

Argon Oxygen Decarburization, frequently referred to as "AOD", is an advanced technology for the refinement of iron, nickel, and cobalt based alloys. By melting a charge in a furnace, and then placing it into the AOD vessel, the metal producer is able to utilize lower cost charge materials, improve mechanical properties, recover nearly 100% of metallic charge elements, and remove dissolved gases, as well as most of the carbon and sulfur. No other process offers similar capabilities in the foundry.

The AOD vessel is a brick lined steel shell with provision for introduction of oxygen and inert gas (argon or nitrogen) below the surface of the molten metal. This introduction causes significant agitation and, therefore, intimate slag-metal contact. Through the management of an additional high oxygen partial pressure gas mix and argon, the metal is refined and can reduce carbon levels to 0.01% or lower. Silicon and aluminum are added to remove more valuable metals from their oxides, resulting in a near 100% recovery.



The chemical removal of other gases allows alloying additions of nitrogen in the molten bath. This is critical for production of modern duplex, super-duplex, and super-austenitic grades. In these cases, AOD is the most cost effective means of achieving the specified nitrogen levels. Silicon levels in the alloy can be lowered by reducing oxygen, allowing users to enjoy better weldability in alloys that they select.

MetalTek operates AOD vessels at its facilities in Waukesha, WI and Pevely, MO to help provide customers with the alloys they need to perform in high corrosion environments. Benefits include cost control and also significant improvement in mechanical properties and corrosion resistance in alloys processed this way. Improvement of ultimate strength, reduction of area, and impact properties are commonly seen in materials across the AOD alloy range.

They are the rationale for inclusion of AOD in many specifications.

As users push toward use of higher performance corrosion alloys, designers will be able to work to take fuller advantage of the design stress allowance of the alloys due to the increased fluidity of AOD refined alloys. Foundries have noted that AOD refined materials allow proper filling and feeding of thinner cross-sections within the component. There can also be a significant reduction in the total use of weld electrode for upgrade, in some cases by over 50%.

AOD is increasingly used by the premier members of the foundry industry like MetalTek, either directly or through purchase of AOD ingot, to improve alloy performance for the user. Its benefits are increasingly recognized in specifications and by the customer.