
Cold wall induction

State-of-the-art clean melting and casting technology


Vacuum induction melting (VIM) furnace


Cold hearth system

Retech's experience and capabilities are uniquely suited to supporting the advancement and implementation of such vital clean melting and casting technologies. Also, Retech places special emphasis on the specific objectives that provide the greatest value to each customer.

The world's leading provider of cold hearth melting systems

Since 1963, the mission at Retech Systems LLC has always been to develop into the leader in the supply of metallurgical processing equipment for demanding industries in ever-changing markets worldwide. The company has been a pioneer in the application of vacuum arc remelting and vacuum induction melting equipment as well as electron beam and plasma cold hearth melting systems. Traditionally, these advanced processes and technologies have been applied to melting, refining, casting and atomisation of reactive and refractory metals, such as titanium, titanium alloys, super alloys and rare earth metals. However, there have been more recent advances at the company related to the production of silicon, glassy metals and even carbides. Each custom engineered Retech system delivers products with the unique metallurgical and geometric properties that are required by the specific customer application.

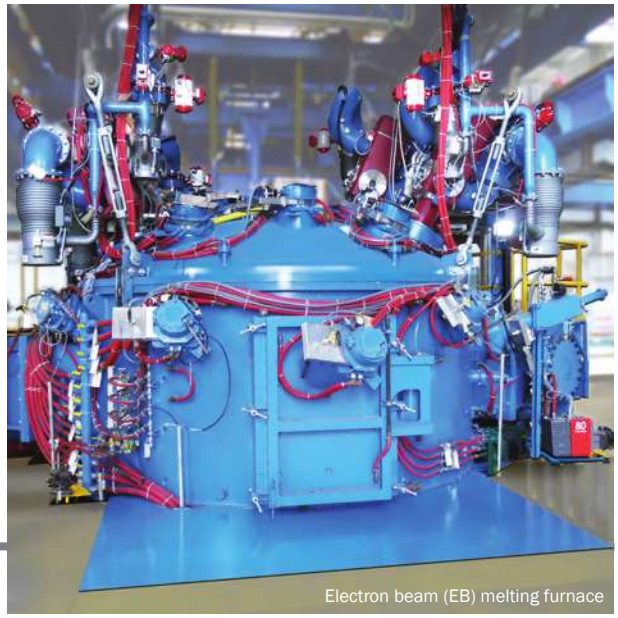
Cold wall induction melting and casting

Vacuum induction melting (VIM) systems are proven to consistently deliver value and competitive advantage through intelligent design, precise and reliable heating, recipe-driven controls and data acquisition. As the need to use induction melting expanded into more critical material and part production, especially for titanium and nickel-based alloys, Retech pioneered the design and engineering of clean, refractory-free, cold-wall crucibles including the equipment used in the production of the first single-crystal turbine blades. The company's cold wall induction (CWI) systems, also called induction skull melting (ISM), utilise a segmented, water-cooled copper crucible, in place of traditional graphite or ceramics, thereby preventing contamination of the charge material(s). The equipment can easily handle a wide range of metals and alloys used in everything from automotive and consumer products to critical, high-value equiax (EQ), directionally solidified (DS) or single-crystal (SC) aerospace parts. The systems can also be configured to meet customer needs and stringent production requirements.

Plasma and electron beam cold hearth melting

The company's plasma (PAM) cold hearth melting system uses an electrically excited gas, typically helium or argon, to melt reactive and refractory metals in a sealed chamber, under inert atmosphere. Similarly, the company's electron beam (EB) cold hearth system capitalises on the ease of use and low maintenance of Von Ardenne electron beam guns for melting metals under hard, or high, vacuum conditions. For either system, the cold hearth is a water-cooled, copper vessel that is

One of the many challenges faced by foundries around the globe is that of cleanly and cost effectively producing the alloys and castings increasingly demanded for critical applications not just in aerospace, but for many non-traditional markets. Expanded use of high-performance and/or specially developed alloys has driven the need to provide key performance advantages, often for distinct functions.



Electron beam (EB) melting furnace

devoid of contaminating elements, like oxygen, and which yields clean, as-cast metal by removing high and low density inclusions during the refining process. Both plasma and electron beam systems can be designed in a wide range of sizes, from low kilos to many tons, as well as production of everything from ingots to castings and, in some cases, even powder.

Introducing Gamma-PAM

The ability to capitalise on the advantages of both cold wall induction and cold hearth melting would seem to be a natural step to take. However, it wasn't until 2012 that demand for the specialised alloys for such a system would prove to be truly valuable. By 2016, Retech, working with Titanium Solutions GmbH of Bremen, Germany, had proven the viability of the basic technology and had developed the process technology to enable cost effective production of the most complex titanium aluminide alloys. The name given to this patented system and process is *Gamma-PAM* and the initial installations are continually proving the capability of this system technology each and every day.

Continuing improvement

Identifying customer needs, as well as understanding the importance of producing relevant, cost-effective technologies, is the foundation upon which Retech is built. As a true innovator, the company continues to contribute important system advancements in many areas of process and technology development, most recently through hybrid plasma arc melting, consumable casting and metal powder production. With over half of Retech's systems built to service international customers, the company understands the need for vacuum metallurgical equipment and processes that are both proven and state-of-the-art.

In 2011 Retech became a part of the SECO/Warwick group of companies which has expanded its global presence through added sales and service centres around the world. Such a widespread exposure benefits all customers through improved proximity.

Additionally, Retech's experience and service, coupled with complete research, development, engineering and manufacturing facilities, are the key elements to the company's and its customers' success. Effectively, the company is also the most fully integrated melting system manufacturer in the world by providing customer access to a wide range of in-house resources, including technology, material and process development. Retech works with each customer to tailor relevant, reliable, and cost-effective solutions all in an effort to achieve the individual requirements of each project, thus being the leader in the supply of metallurgical processing equipment.

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Plasma arc melting