

Championing Hot Briquetted Iron, Steel's Most Versatile Metallic

Hot Briquetted Iron Association: Dedicated to Promoting Hot Briquetted Iron



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Editor's note: As both an associate member of the HBIA and a prominent technology supplier in the HBIA arena, we decided to take this opportunity to highlight the Hot Briquetted Iron Association (HBIA) and their work in promoting HBI.

Hot Briquetted Iron is traditionally known as a compacted form of direct reduced iron for use in an electric arc furnace (EAF). Fifty percent denser than DRI pellets and lump and reducing the tendency for reoxidation, the HBI product form was born out of the need for a direct reduction product ideal for ocean transport to distant consumers.

Hot briquetting of DRI has been practiced on an industrial scale for more than three decades, and is now the preferred

method of preparing DRI for storage and transport internationally. To promote and champion the established product in a growing steel industry, a group known as the Hot Briquetted Iron Association (HBIA) was formed in 1999.

INTRODUCTION OF HBI ASSOCIATION, LTD. (HBIA)

The HBIA is a not-for-profit, international trade organization whose purpose is to promote hot briquetted iron (HBI) as a preferred source of high quality, merchant iron units and to assist the global steel industry in the effective handling, shipping and use of HBI.

HBIA members include all major producers and exporters of HBI, suppliers of process technology, equipment, materials and services, including transportation to the HBI Industry, and traders and brokers involved in buying and selling HBI worldwide.



HBLA objectives are:

- To promote HBI as the preferred source of merchant steelmaking metallics
 - To inform ship owner/operators and charterers and terminal operators of the handling, shipping and storage benefits of HBI
 - To assist iron and steel producers in the effective use of HBI
- HBLA has four types of members:
- Producers – companies that manufacture HBI or have begun construction of an HBI plant, or have assumed the operations of an HBI plant
 - Associates – companies engaged on a continuing basis as either an HBI plant builder or a supplier of technology, goods or services to the HBI Industry
 - Traders – companies engaged on a continuing basis in selling or brokering HBI and other steelmaking metallics
 - Special – individuals who have made noteworthy contributions to the success of the HBI Industry

HBLA members span the gamut of the HBI supply chain, from iron ore mining to transporting and trading HBI. They are leaders in their business areas:

- Suppliers of more than 90 percent of all DR plants
- Leading supplier of pelletizing plants
- Leading supplier of hot briquetting machines
- Leading suppliers of DR-grade pellets
- Most experienced carriers of HBI
- Most experienced port terminal for shipping HBI
- Inventor of soft loading method and equipment

Members are encouraged to participate in the three standing committees: Promotion, Technical, and Transportation. These committees are involved in HBI market development, industry interaction, production and shipping statistics, HBI standards and certifications programs and environmental awareness.

As an HBLA member, companies have:

- Access to and network with the major producers, suppliers and traders of HBI and other steelmaking metallics
- Representation at major worldwide conferences, trade shows and meetings
- Source of news, information and statistics about HBI and the global steel industry

- Voice in international forums that set guidelines for handling, shipping and storage of merchant steelmaking metallics
- Entry into Members Only area of HBLA Web site (www.hbla.org)
- Roster of member companies and contact information

HBLA is a member or has working relationships with Arab Iron and Steel Union (AISU), Association for Iron & Steel Technology (AIST), Dry Bulk Terminals Group (DBTG), International Pig Iron Association (IPIA), South East Asia Iron and Steel Institute (SEAISI), and Sponge Iron Manufacturers Association (SIMA). HBLA has applied for IMO consultative status to provide a collective voice for the HBI Industry, and is helping facilitate registration of HBI under the REACH regulations.

DIRECT REDUCTION GROWTH

As world steelmaking increases each year, there is a growing global need for metallics and often in areas of the world where metallics are not available or are not available in sufficient quantity.

Between the 10-year period 1997-2007, the production of DRI and HBI skyrocketed 86 percent, reaching 67.22 million tons in 2007. Even more remarkable was the 228 percent increase in shipments of DRI and HBI, which vaulted from 7.50 million t/y in 1997 to 17.06 million t/y in 2007 (figures from *Midrex 2007 World Direct Reduction Statistics*).

Sixteen countries account for the world's supply of DRI and HBI, and four of these countries (India, Venezuela, Iran and Mexico) together produce more than half of the total output. Russia, however, is emerging as a leading producer of HBI. Venezuela and India also are HBI producers.

In 2007, Venezuela accounted for approximately 3.61 million tons of the 4.81 million tons of HBI produced by HBI Association members. Russia made up the balance of HBI production. Qatar Steel Company became an HBLA producer member in March 2008.

More than 80 million tons of HBI have been shipped worldwide since the Fior de Venezuela plant made its first delivery to the US in 1978. Of that total, approximately 67 million tons have been transported over water (ocean and inland). Plants located in Venezuela have accounted for more than 45 percent of all HBI shipments since 1978.

WHY HBI?

The first modern day direct reduction plants were built adjacent to steel mills with DRI production intended for local use. As demand developed in areas where captive plants were not feasible, merchant shipments of DRI began. Unfortunately, incidents involving DRI cargoes eventually led to increased insurance rates for shippers and a subsequent decline in ocean transport. A safer way to ship DR products had to be found in order for the merchant market for direct reduction products to grow.

The answer was hot briquetted iron (HBI).

The International Maritime Organization (IMO) issues guidelines for safe shipping and handling of various ocean-going cargoes. The IMO Code of Safe Practices for Solid Bulk Cargoes (BC Code) is the basis for national shipping regulations and for setting bulk cargo insurance rates.

Guidelines for shipping HBI or DRI (A), as it is known by IMO, and conventional DRI, known as DRI (B), are included in the IMO BC Code. A new guideline for DRI and HBI fines, which will be known as DRI (C), is under development.

The IMO recognizes HBI as a form of DRI with superior handling and shipping characteristics, which is reflected in the BC Code.



WHAT IS HBI?

HBI is a compacted form of DRI that is manufactured with well-defined, consistent chemical and physical characteristics. Today, dedicated merchant HBI plants are in operation in Venezuela, Russia, India, Malaysia and Libya. Qatar Steel Company operates a hot discharge plant that includes briquetting capability, and is currently exporting HBI.

HBI is manufactured to be shipped over great distances and melted in a variety of iron and steel processes. It is available throughout the year unlike scrap, which tends to have a collection season. The chemical composition of HBI is certified by the producer, and ISO quality standards are strictly followed.

Physical characteristics are the real reasons that HBI was created. Its greater mass allows rapid penetration of the furnace slag layer. HBI is 100 times more resistant to reoxidation than conventional DRI and will pick up 75 percent less water. HBI generates few fines, which provides greater value to users and reduces safety concerns during handling and shipping. Its size and shape is compatible with standard materials handling equipment, and HBI can be batch charged or continuously fed to a melting furnace.

ADVANTAGES OF HBI

Because HBI is produced from natural iron ores with no additives or binders, it is a source of clean, highly metalized iron units. DRI and HBI share these operational advantages:

- Attractive cost structure when compared with price of imported scrap in countries that have abundant and inexpensive natural gas resources
- Availability of annual supply contracts avoids price spikes of spot market
- Year-round production (no "collection season")
- Well-defined, consistent chemistry with guaranteed specifications
- Low residual content (Cu, Ni, Cr, Mo, Sn, Pb, and V)
- Dilutes impurities in lower quality scrap
- Blends with other metallics for best total charge economics
- Applicable for full range of products, from rebar to sheet steel
- Continuous feeding maximizes power-on time; increases bath weight

- Promotes foamy slag and reduces EAF nitrogen level
- Shields refractory to reduce damage
- Excellent for AC or DC furnaces, long or short arc operation
- Increases iron production in BF; reduces coke rate and CO₂ emissions
- Compatible with injected fuels and oxygen
- Metallic yield in BOF similar to hot metal
- Predictable mass and heat balances

HBI possesses unique characteristics that result in these benefits:

- Density greater than 5.0 grams per cubic centimeter (g/cm³), which allows for rapid penetration of the furnace slag layer
- Higher thermal and electrical conductivity for faster melting
- Less fines generation for added value to the customer
- Less reactive to water for safer ocean and inland transport
- Easy to handle, store and transfer in all types of weather and with standard materials handling equipment

Today, HBI is shipped to iron and steel producers throughout the world. In 2007, 35 percent of the HBI shipped by HBIA producer members was destined for Europe. North America accounted for 25 percent of the HBI shipped, followed by Asia with 18 percent, South America with 14 percent and Africa and the Middle East with seven percent and one percent, respectively.

Direct from Midrex lists more than 20 million t/y of direct reduction capacity capable of producing HBI. Of that total, 13.25 million tons of the 14.15 million tons identified for merchant use is available (operational).

Midrex, Tenova HYL and India's Sponge Iron Manufacturers Association (SIMA) report that almost 21 million tons of new natural gas-based DRI and HBI capacity is either under construction or contract. In addition, a number of projects are under development or preliminary agreement, most notably in Russia and surrounding countries.

Although the primary purpose for these direct reduction plants is to feed a nearby steelmaking operation, the managements of these companies have provided themselves an additional revenue stream and another value-added use of their national energy resources by including the capability to produce HBI for export.

Venezuela is home to the only operating HBI plants in the Western Hemisphere, primarily servicing North America and

Western Europe. Russia, with abundant natural gas and iron ore reserves, is emerging as a key exporter of HBI to Europe and the Near East, while new direct reduction capacity in the Middle East will make HBI available both in the immediate region, as well as to export markets. The presence of indigenous iron ores and the prospects of new natural gas allocations make Indian HBI producers potential suppliers to customers in the SEAISI countries and throughout Asia and the Pacific Rim. In addition, HBI is available from Libya Iron and Steel Company (LISCO) and Antara Steel HBI Operation now that The Lion Group has started up its new plant in Malaysia.

CHAMPIONING HBI

As HBI production and demand continue to increase, further understanding of the product and its benefits are needed. Although initially created for EAF steelmaking, new found uses and practices continue to evolve. For example, HBI currently can be used to reduce CO₂ emissions of a blast furnace to aid in meeting world environmental regulations.

A tried-and-true product like HBI can continue to surprise and benefit the industry. The HBIA mission is to help get this message out to the industry.

Visit the HBI Association Web site at www.hbia.org for information about HBI and HBIA members.