

Indian refractories industry update

Including exclusive interaction with a number of leading players, Sunder Singh presents an overview of the Indian refractories industry for glassmaking.

In the constantly changing world of glass manufacture, to say that refractories play an important role would be an understatement. In fact, refractories are one of the most vital components in glass production. Glass furnace refractories have to endure severe environmental conditions throughout a campaign and proper selection is vital for the quality of glass and the length of campaign. Thermal shock, physical wear, high temperature and corrosive chemicals are parameters affecting the refractory and hence, furnace performance.

Much like the global refractories industry for glass, Indian suppliers have undergone a number of changes in recent years. Reducing specific consumption, the entrance of specialised producers and wider ranges of refractories available from leading producers have made the industry very competitive.

The improvement of refractory materials has played an important role in reducing specific refractory consumption per ton of glass produced and increased furnace performance. The latter factor has also led to much higher melting temperatures and allowed a much higher throughput of molten glass.

India is also following the global trend of falling specific refractory consumption in the glass industry. A figure of 5.4kg per ton of glass produced is still significantly higher than the global average of 3.8kg per ton but a huge

reduction of nearly 3kg per ton has been made since 2009-10, when *Glass Worldwide* presented its last overview of India's refractories industry.

Conventional products are losing ground, while customer-driven product designs are gaining importance. Furthermore, there is increasing demand for total refractories solutions.

"Consumption of refractories in the glass industry is generally decreasing with an increase of campaign life expectation" confirmed Carlo Ratto, CEO of Fused Cast Technologist, one of the leading stakeholders in glass industry refractories. "Modern float glass furnaces are projected to last about 15 years and technology increases could potentially increase that lifespan again. But with the possibility of furnace technology becoming obsolete, there is little minor interest in increasing that lifespan. Modern glass container furnaces have a life expectation of about 12 years. This is slowly growing in a global glass market segment showing a very moderate growth (less than float). In general terms, as a result the fused cast refractories market is stagnant, with very moderate or no growth."

A key executive from the country's largest refractories producer, TRL

Krosaki Refractories Ltd, confirmed that the Indian glass industry is going through a number of key challenges.

"In addition to a slowdown in the domestic market, glass producers are under pressure to enhance furnace life, achieve high productivity and energy efficiency. In such a scenario, refractory suppliers need to accelerate the development of higher technology and improve product quality. We (refractory producers) need to have closer association with technology providers in the glass industry to render complete refractory solutions to meet these demands."

Fused cast refractories in particular have gained a significant market share in recent years. "The global volume is around 100,000 tons per year" Carlo Ratto confirmed. "It sounds a very small amount if you compare with general refractories but there is a very opaque area in China where assumptions might be a bit conservative and again for China, the capacity of fused cast manufacturers is overwhelming if you compare with actual manufacturing levels. After China, the major utilisation is possibly the EU, then North America, non-China Far East and South Asia. Absolute numbers are relatively confusing, since consolidation has affected the global glass and refractories multi-nationals."

Industry	Percentage of refractory consumption
Steel	69.2%
Cement and lime	7%
Ceramics	6%
Glass	4.8%
Chemicals	4%
Non-ferrous metal	3%
Others	6%

Market segmentation of refractories by industry in India.



Saint-Gobain SEFPRO

Among the glass industry's major suppliers, Saint-Gobain SEFPRO is a pioneer in the manufacture of fused cast and sintered refractories. With seven worldwide manufacturing locations, the company is one of the largest producers of refractories for various types of glass melting furnaces.

SEPR Refractories India, a 100% subsidiary of Saint-Gobain SEFPRO, came into being in April 2002, when it acquired the Palakkad, Kerala refractory manufacturing unit from CUMI. The company added a new manufacturing unit at Palakkad in

2009, followed by the addition of a plant at Perundurai in Tamil Nadu. This plant was set up in a 'Special Economic Zone' to cater mainly for export orders. It has an installed capacity of 8000 tonnes for alumina and AZS products.

The company's manufacturing capacity for fused cast refractories is 10,000 tonnes/year and 3500 tonnes/year for sintered refractories. The combined capacities of the Perundurai and Palakkad plants makes SEPR Refractories India one of the world's largest producers of fused-cast refractories at one location. Serving a wide range of glass industry markets, including container, flat, specialty, tableware and fibre, the company says its Indian refractories plants follow universal SEFPRO standards, with the sintered product plant's technology modeled directly on the Savoie Refractaires sintered plant in France.

"In India, fused cast refractory products are only produced at SEPR India plants" Mr R A Rathod from the SEFPRO India sales team confirmed. "The quality of refractory products from our Indian plant is close to the SEFPRO European standard." Only about 10% of total output from Indian operations goes to domestic glass producers, with the rest exported to the EU and USA.

RHI AG

Global refractories major, RHI entered the Indian market by acquiring a majority stake in leading Indian refractory producer, Orient Refractory Ltd. In January 2013, RHI purchased 43.6% of the total share capital of ORL and a further 26% by the end of April 2013 via an open offer through its subsidiary Dutch US Holding BV in the Netherlands. The transaction value for 69.62% totaled approximately €50 million.

RHI produces refractories for the glass industry under the Monofrax and Refel brands and has served the refractory needs of leading glassmakers in Europe and the Americas for many years. Although currently RHI does not produce refractories for the glass industry at its Indian plants, a future production facility dedicated to glass has not been ruled out.

Application	Requirements	Recommended refractories
Crown	Volume stability, low permeability and high refractoriness	Super duty silica bricks
Superstructure	High thermal shock resistance, corrosion and erosion resistance	Zirconia-mullite bricks, mullite bricks
Lower sidewalls	Corrosion resistance	Zirconia-mullite bricks
Bottom paving	High refractoriness under load, corrosion resistance	Fused cast AZS refractories
Insulation	Low thermal conductivity, robust mechanical strength	Silica insulating bricks
Safety layer	High refractoriness under load	High alumina bricks
Repair	Good thermal shock, corrosion resistance	Fused silica bricks, ramming and patching masses

Refractories for different parts of the glass furnace.

Application	Requirements	Recommended refractories
Port lining	Erosion resistance	Fused cast AZS refractories
Chamber crown	Volume stability, low permeability, high refractoriness	Super duty silica bricks, fused mullite bricks
Chamber wall	Alkali resistance	96-98% magnesite bricks
Ride arch, lower wall	Alkali resistance	Andalusite bricks

Refractories for a regenerator.

	2016-17	2015-16	2014-15	2013-14	2012-13	2011-12	2010-11
Production (tons)	NA	1,136,289	1,199,871	1,159,467	1,284,654	1,415,081	1,346,159
Volume growth	NA	- 5.29%	3.48%	- 9.77%	- 9.21%	5.11%	6.23%
Sales turnover (in 000,000s)	NA	667,186	654,007	607,570	569,559	545,822	485,966
Value growth	NA	2.01%	7.64%	6.67%	4.34%	12.31%	26.09%

Refractory production in India over the years. Source: Indian Refractory Manufacturers Association (IRMA).

TRL Krosaki Refractories Ltd

TRL Krosaki Refractories Ltd is a 51% subsidiary of Krosaki Harima Corp of Japan after Tata Steel Ltd, the erstwhile parent company, sold its majority stake in the business. Other shareholders include Tata Steel (~27%) and Steel Authority of India Ltd (~10%).

The company is the largest manufacturer of refractories in India. It offers a comprehensive range of products covering all grades and shapes for industries like glass, steel, copper, cement, aluminium, petrochemicals and other non-ferrous industries. Refractory engineering and management services are also available.

TRL is one of the world's largest manufacturers of dolomite refractories and is the leading supplier of silica refractories for glassmaking and for coke ovens. The company has strategically located manufacturing plants in Belpahar (Orissa), Salem (Tamil Nadu) and Jamshedpur (Jharkhand).

CUMI

Indian company, CUMI (Carborundum Universal Ltd) is an important player in the delivery of refractories for India's glass industry. Created in 1954 as a tripartite collaboration between the Murugappa Group, the Carborundum Co, USA and the UK's Universal Grinding Wheel Co Ltd, CUMI ventured into manufacturing refractories in 1965. The company has a cumulative installed capacity of 36,000 tons of refractory products (6000 tons/year of

bonded refractories and 30,000 tons/year of monolithics).

In 2012, CUMI entered into a techno-commercial agreement with UK-based refractory producers Sheffield Refractories and Anderman Ceramics to manufacture, supply and install a range of high end refractory solutions for the glass industry. These products are manufactured at CUMI's plant at Ranipet. Sheffield Refractories is a leading producer of specialised refractories, while Anderman Ceramics is a leading international distributor of technical ceramic parts and components, with operations in the UK, USA and in France.

Dalmia OCL

The refractories business of Dalmia Bharat Group comprises two specialty companies – OCL Refractories and Dalmia Refractories Ltd. Established in 1954 as a unit of OCL India, OCL Refractories is a leading refractory supplier to domestic and export markets. Set up in 1959, Dalmia Refractories (previously Shri Nataraj Ceramics and Chemical Industries Ltd) is a pioneer in high alumina refractory bricks.

The group's refractories business has four manufacturing plants in India, one in China, a technology centre and sales representatives at strategic locations around the world. The business provides a wide range of refractory products and services to glass and other industries.

Imports

Despite significant local manufacturing capacity, imports account for about 15-18% of total refractory sales to the Indian glass industry. These products are imported mostly from China. ●

About the author:

Sunder Singh is a freelance correspondent

Further information:

email: sunder.singh@gmail.com