Pig iron is basically used for making castings and producing steel. It finds application in industrial and other sectors of economy. The pig iron meant for foundry application contains silicon varying from 1.25 to 3.25%. The consumption of pig iron for this application depends upon the growth in economy, which in turn increases the demand of castings for various applications.

The consumption of pig iron for steel making got enhanced after mushroom growth of electric arc furnace (EAF) and induction furnace (IF) based steel plant. Pig iron is used as one of the constituents of the charge mix in mini steel plants (MSPs) which make steel by melting scrap and or sponge iron and pig iron through EAF or induction furnace route.

Jayawala Neco Ltd., Usha Martin, Jindal Steel & Power and Ispat Industries have integrated their mini blast furnaces (MBFs) and are using the hot metal in charge mix directly for manufacture of steel through EAF. Hospet Steel (Joint Venture of Kalayani and Mukand) and SISCO have integrated their mini blast furnace with energy optimizing furnace for manufacture of steel.

The excess hot metal produced by them supplements the pig iron production. Besides MBF, the COREX plant along with down stream steel making through basic oxygen furnace (BOF) which are in production in Karnataka Jindal Vijayanagar Steel Limited also supplements production of pig iron.

Industry profile

Until the early 1990’s almost all steel plants in India barring TISCO were in the public sector. With the new industrial policy 1990-91, the liberalization of the industry led to an upsurge in private sector players. Up to 1992, the main source of pig iron supply was the integrated steel plants (ISPs). The ISPs did not produce pig iron for foundry application and availability of pig iron was only resulting from the surplus of these plants which otherwise could not be used for steel making. The silicon content in pig iron for steel making ranges from 0.5 to 1.5% and foundries were forced to use such pig iron.

Production of pig iron from merchant units in the secondary sector got a boost after 1992 as indicated above. There after the growth of this sector accelerated and foundry pig iron became the preferred raw material for quality.

Profile of steel industry

Pig iron consumption depends to a great extent on steel industry. In this context, understanding of this profile is important for pig iron manufacturers.
Integrated producers

Integrated producers are those that convert iron ore into steel. The three majors are SAIL, TISCO and RINL in public sector.

Secondary producers

Secondary producers are those plants which make steel through DRI, scrap and pig iron melting. Essar Steel, Ispat Industries, Lloyd Steel etc. are the main players in addition to others.

In secondary producers other group of producers is using BF hot metal as main source of input to make steel. The main producers in this category are: Jayaswals Neco Ltd., Usha Martin, Kalayani Hospet, SISCOIL, Ispat Industries etc.

It is observed from the above chart that India’s production of pig iron has increased from about 3 mt in 1998-99 to about 5.22 mt in 2003-04, recording an overall growth of 73.98 percent in five years. The share of secondary producers in India’s total production has jumped from 54.83 percent in 1998-99 to 81.48 percent in 2003-04. This has happened because the integrated steel plants have restricted their output of pig iron for producing higher volumes of value-added steel products and generation of higher profits. The increased production of foundry grade pig iron by secondary producers has helped to boost up their share.

The increase in production of secondary producers has been contributed mainly by major players like Jayaswals Neco, Ispat Metallics, NINL, JSPL, Sesa Goa, Kalinga Iron, Tata Metallics etc. who have increased their production during the past few years.

Lower production by integrated steel plants

As stated earlier, the integrated steel plants have taken a decision to reduce the production of pig iron to increase the output of value-added steel products to ensure higher profitability. Tata Steel is not producing pig iron for sale for many years. The four major plants of SAIL produced 354,000 tonnes of pig iron in 2001-02 but in 2003-04 it has been reduced by 13.85 per cent to 305,000 tonnes in just two years. Likewise, Vizag Steel Plant which produced 517,000 tonnes in 2002-03, reduced it production in 2003-04 to 439,000 tonnes recording a drop of 15.09 per cent in one year.

IISCO is the only integrated steel plant which is producing some foundry grade pig iron though its production also dropped by 21.56 per cent in 2003-04 at 222,000 tonnes from 283,000 tonnes in the previous year.

Mini blast furnaces (MBFs)

After encouragement by the government for setting up MBF in
secondary sector to free the integrated steel plant of other social responsibility of producing pig iron. Sesa Goa Ltd., set up a MBF using Brazilian Mini Blast Furnace Technology from KORF to produce foundry grade pig iron in 1992. The product was well accepted in the foundry market. This was followed up by many more producers. Jayaswals Neco Limited took the lead and was pioneer in setting up the mini blast furnace of Chinese Technology from Shougang International Inc., China having 650 Cu.M volume. Thereafter, many more MBFs were installed and are as given below:
- Jayaswals Neco Limited
- Ispat Metallic Limited
- Kalinga Iron Works
- Kirloskar Ferrous Industries Limited
- Kudremukh Iron & Steel Company Limited
- LANCO Steel Industries Limited
- Sathwahna Ispat Limited
- Tata Metallic Limited
- Usha Ispat Limited
- Vishveshvariya Iron & Steel Company
- Usha Beltron Limited
- Hospet Steel
- SISCOL
- Jindal Vijayanagar Steel
- SESA Goa, etc.

There are 26 blast furnaces units in India, at present, with an installed capacity of about 4 mt/year. The MBF sector in India at present as a total investment of over Rs.4000 Crore and employee a direct workforce of about 35,000. India exports sanitary castings and industrial castings of about 650 crore, according to industry experts.

**Demand of pig iron**

As discussed earlier, the demand of pig iron depends upon growth in steel industry and castings.

As can be seen, the demand was reduced by 7.82 per cent in 2001-02 over the previous year and it was hiked by 27.02 percent in FY’04 over 2002-03. The reasons for such variations are clear as the apparent consumption of pig iron in India shows a consistent growth between 1998-99 and 2003-04.

Demand of pig iron got accelerated with improved economy but off late the buoyancy in the market demand for pig iron has dampened and the price has started falling down.

It is evident from the above table that Punjab / Chandigarh (including HP) was the highest consumer in the aforesaid two years followed by West Bengal and Maharashtra (including Goa).

**Export and import of pig iron**

Export and import of pig iron is shown in chart 3.

Pig iron export has been fluctuating wildly depending upon international competitiveness. Highest export to the
extent of 785000 tonnes was made in 1997 and from last two years export is substantial (576000 tonnes in 2004, 629000 tonnes in 2003).

**Lam coke scenario**

One of the principle input in these furnaces is metallurgical coke with ash content up to 12% and is most essential raw material for producing pig iron. As low ash content coke is not available in India, it is being mainly imported mostly from China. Central government has withdrawn the anti dumping duty on the import of met coke from 2000-2001. To facilitate import on custom duty on coking coal with less than 12% ash content, was reduced to 5% in January’2003 and to nil in February’2004.

The cost of production of pig iron through MBF mainly depends upon the landed price of imported coke. The price fluctuation of coke is shown in Chart 2.

It can be seen that coke price shot up from $85 in 2001 to US $+ 400 in 2004. Thereafter, it started coming down and presently it is at the level of $140 to 150/ tonne. This price fluctuation has created a big pressure on MBF plants and they could not utilize the growing demand of pig iron due to badly escalated cost on account of coke and iron ore price.

**Some new developments**

(a) NMDC is selling up a 0.3 Mt pig iron plant based on the Russian Romelt technology in Nagamar, 16 kms from Jagdalpur in Chattisgarh. The project will cost about Rs.300 crore in the first phase which is scheduled for commissioning by 2005. After successful running of the plant, addition of two more Romelt modules of 0.6 million tonnes per year each may take its capacity to 1.5 million tpy. This would be the first Romelt plant outside Russia.

(b) Tata Metaliks is investing Rs.40 crore for its second blast furnace in Kharagpur in West Bengal. The company’s production, after the new blast furnace is commissioned, will be 263,000 tpy against 140,000 tpy at present. The company has plans to enhance its presence in the southern and western part of the country either through acquisition or greenfield projects.

(c) Mecon in collaboration with Kalinga Iron works has developed a process technology to use overburden of chromite mines for producing Ni-Cr bearing alloy pig iron in blast furnace for the first time in the country. The Ni-Cr bearing pig iron will be subsequently used in EAF for production of low alloyed steel resulting in considerable saving on account of ferro-alloy consumption. Further, the alloyed pig iron can be conveniently used for production of Ni-hard iron castings in foundries for power plants and other industrial components.

(d) Jayaswals Neco is contemplating to enhance the capacity of existing Blast furnace by suitable modification during forthcoming capital
Repair.

**Issues & Initiatives**

Pig iron market is very much linked with the steel market. The following issues are hovering over the industry’s sluggish demand in domestic market:
- Declining export,
- Declining international price,
- Increase in manufacturing cost leading to low competitiveness and
- Threat of dumping from countries having surplus.

**Conclusion**

With the onset of liberalization, the industry has now to gear up through domestic and international competition in terms of product and price.

The growth of pig iron industry is intricately linked with the growth of pig iron consuming sector like foundry and Steel industry. Presently pig iron export can be attempted by integrated public sector plants where coke and iron ore are sourced from their own captive source.

Export will rise and fall, production and production capacities are increasing. The factors/issues responsible for growth of pig iron consuming sectors need to be continuously addressed and government initiative and supports are required to be provided. In order to increase competitiveness, cost of production has got to be brought down significantly. As expense on coke accounts for 60-70% of cost of pig iron, coke management including sourcing, pricing and consumption is of paramount importance. All investments needed for reducing coke consumption have to be made in order to become more cost competitive.

Presently the market sentiments are poor and pig iron price is having a downward trend. Looking at increased requirement by pig iron consuming sectors after monsoon, the pig iron price is likely to firm up and stabilize.