

7 Mineral-based Industries

Minerals are vital raw materials for many basic industries and are major inputs in industrial development. The management of mineral resources, hence, has to be closely integrated with the overall strategy of development and exploitation of minerals, which is to be guided by the long-term national goals. In tune with the Economic Liberalisation Policy, adopted in July 1991, the new National Mineral Policy was announced in March 1993, fully opening up the mineral sector for private entrepreneurs, both domestic and foreign. Keeping in view the changing global scenario, the National Mineral Policy is revised in 2008 to spell out the different elements of policy for the development of mineral resources of the country. However, the recent global financial recession certainly had impacted the Indian Mineral-based Industries as well.

Capacity and production of important mineral-based products are given in Table-1.

FERROUS METALS

India is poised with brownfield expansion of existing steel plants, backward integration of re-rollers, forward integration of DRI or pig iron producers and emergence of few greenfield projects. The National Steel Policy (NSP) was announced in 2005. The NSP has set up a target of 110 million tonnes of domestic steel production by 2020.

Total production of finished steel for sale during 2009-10 stood at 59.69 million tonnes as against 57.16 in the previous year. Total finished steel exports in 2009-10 decreased to 3.14 million tonnes from 4.19 million tonnes in 2008-09. The imports of finished steel were at 2.99 million tonnes which were higher compared to 2.23 million tonnes in 2008-09.

In the context of long-term demand projection of steel, the Government adopted a two-pronged strategy for increasing steel production in the country through modernisation and expansion of existing public sector steel plants in the country and encouraging creation of new steel capacities in private sector.

Pig Iron

Pig iron is the basic raw material in foundry and casting industry for the manufacture of various types of castings required for engineering sector. The main sources of pig iron have traditionally been the integrated

steel plants of SAIL besides plants of Tata Steel and Rashtriya Ispat Nigam Ltd. The domestic production of pig iron did not keep pace with the demand. Efforts were, therefore, made to increase pig iron manufacturing facilities in the secondary sector.

As a result of various policy initiatives taken by the Government, private sector showed considerable interest in setting up new pig iron units in the post-liberalised period. Of the total 5.73 million tonnes production, 5.0 million tonnes was reported by the private sector. This has resulted in drastic change in the contribution of private/secondary sector units from merely 8% in 1991-92 to more than 87% by 2009-10. M/s Usha Martin Industries Ltd, M/s Jindal Steel & Power Ltd and M/s Ispat Industries Ltd have integrated mini-blast furnaces (MBF) for manufacture of steel through Electric Arc Furnace (EAF). M/s Hospet Steel (a joint venture of Kalyani and Mukand) and M/s Southern Iron & Steel Co. Ltd had integrated their MBF with energy optimising furnace to produce steel. Besides MBF, M/s JSW Steel Ltd (formerly Jindal Vijaynagar Steel Ltd) had commissioned a Corex Plant (alternate to conventional MBF/BF) along with downstream basic oxygen furnace (BOF) for steel making to supplement production of pig iron. The KIOCL is now in the process of setting up a 100,000 tpy capacity ductile iron spun pipe plant. The pig iron industry is facing problem of rising production cost due to price-escalation of imported metallurgical coke.

In 2009-10, about 5.73 million tonnes pig iron was produced against 6.21 million tonnes in 2008-09. Location and capacity of principal pig iron units in private sector are furnished in Table-2.

Sponge Iron

During early 1990s, sponge iron industry had been specially promoted so as to provide an alternative to steel melting scrap which was increasingly becoming scarce. Due to combined use of hot metal and sponge iron in electric arc furnace for production of liquid steel during the last few years, sponge iron production went up substantially. Now, India has emerged as the largest producer of sponge iron in the world. The installed capacity of sponge iron increased from 1.52 million tonnes per annum in 1990-91 to 31 million tonnes per annum in 2009-10. The production also increased from 0.9 million tonnes in 1990-91 to 20.738 million tonnes in 2009-10.

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Production of sponge iron in the country has resulted in providing an alternative feed material to steel melting scrap which was earlier imported in large quantities by the Electric Arc Furnace units and the Induction Furnace units for steel making. This has resulted in considerable saving in foreign exchange as well as alternate route for production of steel through EAF in the country. Presently, about 324

sponge iron units are installed in the country. Out of this, there are 3 gas-based hot briquetted iron (HBI) units covering a capacity of 8 million tonnes per annum. The capacity of gas-based sponge iron plant of Essar Steel Ltd, the world's largest sponge iron producer has gone up to 5.5 million tpy. Plantwise details as available in respect of principal sponge iron units are furnished in Table-3.

Table – 1 : Capacity and Production of Important Mineral-based Products, 2008-09 and 2009-10

Mineral-based product	Unit of quantity	Annual Installed capacity	Production	
			2008-09	2009-10 (P)
Ferrous Metals				
Hot metal	'000 tonnes	36760	37055	38963
Sponge iron	"	30900	21091	20738
Crude/liquid steel	"	72963	58437	64875
Ferro-alloys				
Ferro-chrome/Charge-chrome	"	1300	817	892
Ferro-manganese	"	2100	385	389
Silico-manganese	"	NAS	891	1100
Ferro-silicon	"	200	100	102
Noble ferro-alloys	"	40	27	31
Non-ferrous Metals				
Aluminium	"	1780.5	1347	1481
Copper #	"	1001.5	514	533
Lead (primary)	"	85	60.3	64.3
Zinc Ingots	"	917	579	614
Asbestos-Cement Products				
Asbestos sheets & accessories	'000 tonnes	NA	2232	2435
Asbestos-cement pressure pipes	"	150	150	150
Refractories				
	"	2013	1252	1252
Cement				
	Million tonnes	277	186	205
Ceramic				
Ceramic tile	'000 tonnes	2100	1381	1454
Sanitaryware	'000 tonnes	196	400	431
Crockeryware	"	343	66	73
H.T. insulators	"	NA	56	61
Fertilizers				
Nitrogenous	"	12061	10870	11968
Phosphatic	"	5659	3465	4352
Chemicals				
Aluminium fluoride	"	27	19	27
Sulphuric acid	"	NA	6395	7440
Caustic soda	"	2650	2034	2088
Calcium carbide	"	142.4	68	23
Soda ash	"	2630	2006	2041
Synthetic rutile	"	237	62	71
Titanium dioxide Pigment	"	77	54	64
Petroleum Refinery Products				
	"	182386**	150516	179769

- Sources :**
1. Ministry of Steel Annual Report, 2010-11 and JPC Bulletins.
 2. Ministry of Commerce & Industry, Department of Industrial Policy & Promotion and Annual Report, 2010-11.
 3. Ministry of Chemicals & Fertilizers, Department of Chemicals & Petrochemicals, Annual Report, 2010-11.
 4. Basic Statistics on Indian Petroleum & Natural Gas, 2010-11.
 5. Indian Ferro Alloys Producers' Association (IFAPA), Mumbai.
 6. Cement Manufacturers, Association.
 7. Indian Refractory Makers' Association, Kolkata.
 8. Department of Atomic Energy.
 9. Information received from individual plants in organised sector.
- ** Throughput capacity of refineries.
Production relates to copper cathodes .

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Table – 2 : Location and Capacity of Principal Pig Iron Units in Private/Secondary Sector

(In lakh tonnes)

Sl.No.	Unit	Location	Annual capacity
1.	Lanco Industries Ltd	Chittoor, Andhra Pradesh	1.50
2.	Sathavahana Ispat Ltd	Anantapur, Andhra Pradesh	1.20
3.	Jaiswal NECO Ltd (Nagpur Alloy Castings)	Raipur, Chhattisgarh	3.50
4.	Sesa Goa Ltd	Bicholim, Goa	1.80
5.	Usha Martin Industries	Jamshedpur, Jharkhand	1.10
6.	KIOCL Ltd	Mangalore, Karnataka	2.27
7.	Jindal Vijaynagar Steel Ltd	Bellary, Karnataka	7.20
8.	Kalyani Ferrous Industries Ltd	Koppal, Karnataka	1.20
9.	Kirloskar Ferrous Industries Ltd	Koppal, Karnataka	2.40
10.	Usha Ispat Ltd	Redi, Maharashtra	3.00
11.	Ispat Metalics India Ltd	Dolvi, Raigad, Maharashtra	20.00
12.	Kalinga Iron Works	Barbil, Keonjhar, Odisha	1.40
13.	Electrosteel Castings Ltd	Khardah, West Bengal	1.10
14.	Tata Metaliks Ltd	Kharagpur, West Bengal	0.90
15.	Kajaria Iron Castings Ltd	Durgapur, West Bengal	1.10

Source: Development Commissioner for Iron & Steel, Ministry of Steel, Kolkata and individual plants.

Table – 3 : Location and Capacity of Principal Sponge Iron (DRI) Plants

(In lakh tonnes)

Sl. No.	Company	Location	Annual capacity
Gas-based			
1.	Essar Steel Ltd	Hazira, Surat, Gujarat	55.00
2.	Vikram Ispat	Salav, Raigad, Maharashtra	9.00
3.	Ispat Industries Ltd	Geetapuram, Dolvi, Raigad, Maharashtra	16.00
Coal-based			
1.	GSAL (India) Ltd	Srirampuram, Vizianagaram, Andhra Pradesh	2.20
2.	HEG Ltd	Borai, Durg, Chhattisgarh	1.20
3.	Jindal Steel & Power Ltd	Kharsia Road, Raigarh, Chhattisgarh	13.70
4.	Monnet Ispat & Energy Ltd	Chandkhuri Marg, Hasaud, Raipur, Chhattisgarh	10.00
5.	Prakash Industries Ltd	Champa, Jangir Champa, Chhattisgarh	4.50
6.	Sarda Energy & Minerals Ltd	Siltara, Raipur, Chhattisgarh	3.60
7.	Alliance Integrated Metaliks Ltd	Bemta, Raipur, Chhattisgarh	5.00
8.	Godawari Ispat & Power Ltd	Siltara, Raipur, Chhattisgarh	4.95
9.	Shri Bajrang Power & Ispat Ltd	Urla, Raipur, Chhattisgarh	2.10
10.	Ind Agro Synergy Ltd	Kotar, Raigarh, Chhattisgarh	3.00
11.	Nova Iron & Steel Ltd	Dagori, Bilaspur, Chhattisgarh	1.50
12.	Nalwa Sponge Iron Ltd	Taraimal, Raigarh, Chhattisgarh	1.98
13.	Singhal Enterprises Pvt. Ltd	Taraimal, Raigarh, Chhattisgarh	1.94
14.	Global Hi-Tech Industries Ltd.	Gandhian Gujarat	1.05
15.	SKS Ispat Ltd	Raipur, Chhattisgarh	4.20
16.	Chhattisgarh Steel & Power Ltd	Champa, Chhattisgarh	3.15
17.	MSP Steel & Power Ltd	Jamgaon, Raigarh, Chhattisgarh	3.95
18.	Crest Steel & Power (P) Ltd	Jortarai, Rajnandgaon, Chhattisgarh	1.05
19.	Jagdamba Power & Alloys Ltd	Munrethi, Chhattisgarh	1.50
20.	API, Ispat & Power Tech. (P) Ltd	Siltara, Raipur, Chhattisgarh	2.10
21.	Akshay Investment (P) Ltd	Joratarai, Rajnandgaon, Chhattisgarh	1.05
22.	NMDC	Nagarnar, Bastar, Chhattisgarh	1.00
23.	Vandana Ispat	Kopedih, Rajnandgaon, Chhattisgarh	8.30
24.	Niros Ispat (P) Ltd	Bhilai, Chhattisgarh	1.8
25.	Sunil Ispat & Power Ltd	Chhattisgarh	1.15
26.	Goa Sponge & Power Ltd	Goa	1.00
27.	Global Hi-Tech Industries Ltd	Gandhidham, Gujarat	1.05
28.	Bihar Sponge Iron Ltd	Chandil, Singhbhum, Jharkhand	1.86
29.	Sunflag Iron & Steel Co. Ltd	Bhandara, Maharashtra	1.50
30.	Lloyds Metals & Engineers Ltd	Ghugus, Chandrapur, Maharashtra	2.70
31.	Orissa Sponge Iron Ltd	Palasapenga, Keonjhar, Odisha	2.50
32.	Tata Sponge Iron Ltd. (Ipitata Sponge)	Joda, Keonjhar, Odisha	3.90
33.	Sree Metaliks Ltd	Loidapada, Keonjhar, Odisha	1.74
34.	Action Ispat & Power Pvt. Ltd	Marakuta & Pandaripathar, Jharsuguda, Odisha	2.50
35.	Adhunik Metaliks Ltd	Chadriharipur, Sundergarh, Odisha	1.80
36.	OCL India Ltd	Lamloi, Sundergarh, Odisha	1.20
37.	Scaw Industries Pvt. Ltd	Gundichapada, Dhenkanal, Odisha	1.00
38.	Rungta Mines Ltd	Karakola and Kamando, Sundergarh, Odisha	1.50
39.	Vallabh Steels Ltd	Sahnewal, Ludhiana, Punjab	1.20
40.	Jai Balaji Sponge Ltd	Baktarnagar, Raniganj, West Bengal	1.05
41.	Shyam Sel Ltd	Dewabdihi, Burdwan, West Bengal	1.00

Source: Sponge Iron Manufacturers' Association (SIMA) and individual plants.

Finished Steel/Saleable Steel

With the onset of liberalisation, steel industry is now gearing up, not only to domestic competition, but also to global competition in terms of product range, quality and price. Provisional data indicates a total finished steel consumption during 2009-10 at 57.675 million tonnes, a growth of 10.2% compared to previous year. India has become self-sufficient in iron and steel materials in the last 5-6 years. China has been an important export destination for Indian steel. Exports and imports are fluctuating.

Some significant facts on Indian steel industry are as follows:

1. The National Steel Policy (NSP) was announced in 2005. The NSP has set up a target of 110 million tonnes of domestic steel production by 2019-20. The policy envisages encouragement of investment in steel sector by removing the bottlenecks. NSP 2005 is presently under review and a new National Steel Vision is being drafted.
2. The Indian steel industry recorded a production of 59.692 million tonnes of finished carbon steel in 2009-10, an increase of 4.4% over the preceding year.
3. The total estimated volume of exports of finished steel decreased by 24.9% to 3.143 million tonnes and the imports increased to 2.986 million tonnes by 33.9%

The finished steel production for sale has grown from a mere 1.1 million tonnes in 1951 to 59.69 million tonnes in 2009-10. The growth in the steel sector in the initial decades since Independence was mainly in the public sector units set up during this period. The situation changed dramatically in the decade 1990-2000 with growth originating mostly in the private sector. Details about capacity and production of crude steel by main producers are furnished in Table-4.

Public Sector

Steel Authority of India Ltd (SAIL)

SAIL, a public sector company, operates four integrated steel plants at Bhilai in Chhattisgarh, Bokaro in Jharkhand, Durgapur in West Bengal and Rourkela in Odisha. Besides, another integrated steel plant IISCO at Burnpur is owned by SAIL. IISCO was earlier a subsidiary of SAIL. Its merger with SAIL became effective from February 2006. SAIL plants recorded crude steel production during the year 2009-10 at 13.51 million tonnes and 13.41 during the year 2008-09.

SAIL plans to set up 3 million tonnes/year each steel plant in Mangolia & Indonesia aiming to spread its wings beyond the country.

The assets of erstwhile Malvika steel at Jagdishpur were acquired & registered by SAIL in June 2010 & SAI is building a high-tech steel making facility at its Jagdishpur unit.

SAIL's corporate vision for growth up to 2011 for hot metal was 26.2 million tonnes.

Rashtriya Ispat Nigam Ltd (RINL)

Rashtriya Ispat Nigam Ltd (Visakhapatnam Steel Plant), a public sector company, has the first shore-based integrated steel plant commissioned in 1992 at Visakhapatnam, Andhra Pradesh. The installed capacity for the production of liquid steel and saleable steel was over 3 million tonnes each. The Government has approved the expansion plan of RINL for enhancing liquid steel capacity to 6.3 million tonnes which is in progress. The new units were set to go on stream progressively from 2011-12. In 2009-10, the plant produced 3.9 million tonnes of hot metal and 3.2 million tonnes of liquid steel. Production of saleable steel was 3.167 million tonnes.

Neelachal Ispat Nigam Ltd (NINL)

NINL, a joint venture company promoted by MMTC and Government of Odisha has set up a 1.1 million tpy integrated steel plant at Kalinganagar, Duburi, Jajpur district, Odisha. The first phase is already commissioned and is presently producing pig iron through BF route with 1.1 million tpy hot metal capacity. Other operating facilities include a coke oven battery (0.81 million tpy), a sinter plant (1.71 million tpy), slag granulation plant (0.3 million tpy), a gas-based captive power plant with total 62.5 MW capacity and an ammonium sulphate plant (12,750 tpy). Expansion and addition of facilities in Phase-2 presently under implementation comprise pig iron for sale (153 thousand tpy), a BOF and a ladle furnace of 110 t capacity each, continuous billet caster and a bar & rod mill. The production capacity after Phase-2 will be pig iron for sale (153 thousand tpy), wire rods (0.3 million tpy), billets for sale (175 thousand tpy), and straight, rounds & square bars (0.4 million tpy).

RINIL was in advance stages of talks with MMTC for acquiring the other state owned, unlisted steel maker Neelachal Ispat Nigam. MMTC holds about 50% of shares of NINL.

Private Sector

The private sector continued to play a dominant role in the production of steel in the country. The contribution of private sector in finished steel production increased substantially since 1992-93. The performance of major private sector producers is summarised below:

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**Table – 4 : Installed Capacity and Production of Finished Steel (for Sale)
(By Principal Producers)**

(In '000 tonnes)

Producer	Annual Working capacity (Crude/liquid steel)	Production	
		2008-09	2009-10
Total Production	–	57164	59692
SAIL			
Bhilai Steel Plant, Bhilai, Dist. Durg, Chhattisgarh	3925	3604	3356
Rourkela Steel Plant, Rourkela, Dist. Sundergarh, Odisha	1900	1944	1969
Durgapur Steel Plant, Durgapur, Dist. Burdwan, West Bengal	1802	671	666
Bokaro Steel Plant, Bokaro, Dist. Bokaro, Jharkhand	4360	3274	3370
IISCO Steel Plant, Burnpur, Dist. Burdwan, West Bengal	500	318	326
Alloy Steel Plant; Durgapur Dist. Burdwan, West Bengal	234	35	24
Salem Steel Plant, Salem, Dist. Salem, Tamil Nadu	320*	180	146
Visvesvaraya Iron & Steel Plant, Bhadravati, Dist. Shimoga, Karnataka	127	89	65
Totals : SAIL		10115	9922
RINL			
Visakhapatnam Steel Project, Dist. Visakhapatnam, Andhra Pradesh	2410	2558	2959
Total : Public Sector		12673	12881
Private Sector			
Tata Steel Ltd, Jamshedpur, Dist. Singhbhum, Jharkhand	6800	5646	6563
JSW Steel Ltd, Vijaynagar, Karnataka	6800	3218	5257
ISPAT Industries Ltd, Dolvi, Maharashtra	3000	2201	2689
ESSAR Steel Ltd, Hazira, Madhya Pradesh	4600	3342	3474
JSPL, Raigarh, Chhattisgarh	3000	1457	1961
Other Producers (estimated)		34143	30776
Less: Own consumption	–	6281	5773
Total : Private Sector	–	44491	46811

Source: Annual Report, Ministry of Steel 2010-11 & replies received from individual plants/JPC Bulletins.

* Saleable steel.

Tata Steel Ltd

Tata Steel has an integrated steel plant having an annual crude steel production capacity of 6.8 million tonnes after its brownfield expansion in first phase located at Jamshedpur, Jharkhand. Tata Steel had achieved a production of 6.563 million tonnes of crude steel and 7.66 million tonnes of sinters in 2009-10.

In second phase expansion, the capacity is to be raised to 9.7 million tpy. The company has embarked upon setting up various greenfield projects too. The project at Kalinganagar in Odisha envisages setting up of a 6 million tpy capacity integrated steel plant in two phases of 3 million tpy each. MoUs have been signed with the Government of Chhattisgarh to set up a 5 million tpy capacity steel plant in Bastar region in 2 phases and with Government of Jharkhand for a 12 million tpy steel plant in 2 phases of 6 million tpy each in Manoharpur-Saraikella area. The plants are to be set up subject to raw materials linkage and receipt of all approvals.

JSW Steel Ltd, Vijayanagar

Erstwhile Jindal Vijayanagar Steel Ltd (JVSL) has conceived a technologically modern and efficient integrated steel plant of 6.8 million tpy capacity. The plant adopts a process route consisting broadly of iron ore beneficiation-pelletisation-sintering-coke making iron making through BF, as well as Corex process which entails steel making through BOF-continuous casting of slabs- hot strip rolling-cold rolling mills. JSW Steel Ltd has an installed crude steel capacity of 6.8 million tpy with value added products constituting 1.8 million tpy spread across four locations; Toranagallu (Vijaynagar Works), Salem (Salem Works), Vasind and Tarapur (downstream units). Vijaynagar works has integrated operations from beneficiation plant to 1 million tpy Cold Rolling Mill Complex. The slabs and HR coil produced at Vijaynagar works are further processed in downstream units at Vasind and Tarapur into value added facilities: cold rolling (1.0 million tpy), hot dip galvanising (HDG) (0.9 million tpy), colour coating (0.1 million tpy), CRCA products (0.1 million tpy) and hot rolled plates (0.3 million tpy). The Salem works has an integrated manufacturing facility with an overall crude steel capacity of 1 million tpy, comprising of sinter plant, blast furnace, EOF, billet caster, bloom caster and rolling with associated facilities such as coke oven, power plant, oxygen plant, etc. Vijaynagar Works' existing operations produce flat steel products, Salem Works' focus is only on long products and the downstream units

produce CR/galvanised, colour coated, value added flat products. Expansion project at Vijaynagar works increasing the capacity from 6.8 million tpy to 9.6 million tpy by 2011-12 is underway.

Two subsidiaries of the company M/s JSW Bengal Steel Ltd and M/s JSW Jharkhand Steel Ltd are incorporated to set up greenfield steel plants with 10 million tpy capacity each in West Bengal and Jharkhand, respectively. The company is in possession of required land in West Bengal while in Jharkhand it has obtained a mining lease for iron ore and also got the mining plan approved. JSW Steel offers the entire gamut of steel products and it is one of the lowest cost steel producers in the world.

Jindal Steel & Power Ltd (JSPL), Raigarh

The sponge iron plant at Raigarh, Chhattisgarh has capacity of 13.7 lakh tpy and 30 lakh tpy steel melting shop in addition to 2.5 lakh tpy capacity sinter plant, 8 lakh tpy coke oven plant and 12.5 lakh tpy blast furnace. This is the world's largest coal-based sponge iron facility. The crude steel capacity of JSPL is 3 million tpy with proposed expansion of capacity to 6 million tonnes at Raigarh, Chhattisgarh. A new steel shop (SMS-II) has been set up comprising two EAFs, a continuous caster, a billet caster, etc. Capacity expansion to 7 million tpy underway at Raigarh plant by 2011 includes: 6 million tpy gas-based DRI plant (based on coal gassification), 4000 cu m blast furnace, 3 million tpy steel melting shop with EF route and 4 million tpy through BOF route along with 4 million tpy hot metal. Besides, thin slab caster, hot strip mill, cement plant (to consume BF slag) and additional 540 MW power plant are also planned. As a part of expansion, JSPL is setting up a 12.5 million tonnes integrated steel plant at Angul in Odisha and 6 million tonnes integrated steel plant at Patratu in Jharkhand. It is planned to implement these projects in phases. JSPL is setting up a 10 million tpy pellet plant at Barbil, Odisha utilising huge iron ore fines lying with various iron ore mines. The first module of 4.5 million tpy was undergoing trial runs since January 2010. It produced 2.27 lakh tonnes pellets by the end of 2009-10.

JSPL had entered into an agreement with Bolivian Govt. for construction of 1.7 million tonnes per annum steel plant, 6 million tonnes per year sponge iron plant & 10 million tonnes per annum pellet plant with 40 years contract to mine about half of reserves of EL mutun mines in Bolivia which is one of the world's single biggest iron ore deposits.

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JSW Steel offers the entire gamut of steel products and it is one of the lowest cost steel producer in the world.

Jindal Stainless Ltd

The company has a fully integrated stainless steel plant at Hissar in Haryana with a capacity of 600,000 tpy which is now expanded to 720,000 tpy. The ferro-alloys plant of the company is located at Jindalnagar, Kothwasala in district Vizianagaram, Andhra Pradesh. The plant has 40,000 tpy high carbon ferro-chrome capacity and caters to domestic markets and developed countries. The company is also setting up a greenfield integrated stainless steel plant at Kalinganagar in Jajpur district in Odisha for production of ferro-alloys and stainless steel. The project will comprise 1.6 million tpy stainless steel plant, a 500 MW captive power plant and a coke oven battery. The production from ferro-chrome furnace has already been started and it has stabilised.

Southern Iron & Steel Co. Ltd (SISCOL)

SISCOL is a JSW Group company producing hot metal and pig iron (foundry and basic grades) through mini blast furnace. For steel making, the company has installed an energy optimising furnace (EOF) and a ladle furnace of 30 t capacity each, besides a continuous casting machine to cast billets/blooms. Additionally, the company also has a bar & rod mill of 300,000 tpy capacity and a captive power plant of 7.7 MW. There is also a 425 tpd sinter plant to feed the blast furnace. The company plans to enhance the capacity of the plant located near Mettur, Tamil Nadu, from existing 0.3 million tpy to one million tpy at an investment of Rs.1,350 crore and further to 2 million tpy at investment of about Rs.3,000 crore, on availability of iron ore. The company also intends to set up a one million tpy slag grinding unit.

Essar Steel Limited (ESL)

The company has a 5.5 million tpy gas-based HBI plant at Hazira, Gujarat. The state-of-the-art hot-rolled coil (HRC) steel plant with a capacity of 4.6 million tpy is being expanded to 10 million tpy. The complex also houses a cold-rolled coil plant of 1.4 million tpy capacity. It is the largest fully integrated manufacturer of high quality flat steel products in western India. The company enjoys a decided advantage with respect to its port-based location, which helps in bringing in raw materials and rendering better service to domestic and export customers. The company has a captive port capable of handling up to 8 million tpy cargo with modern

handling equipment like barges and floating cranes. The combined annual cargo handling capacity of all terminals would be 150 million tonnes. The company has embarked upon procurement of DRI plant equipment, EAF with accessories, corex plant equipment, etc. from global suppliers with a view to expanding present capacities. The company has proposed greenfield project capacity of 6 million tonnes, 3.2 million tonnes & 6 million tonnes in the states of Odisha, Chhattisgarh and Jharkhand, respectively. The construction of 12 million tonnes per annum pellet plant at Paradip, Odisha has been completed and mechanical commissioning has got started; post commissioning, the company will have a total pelletisation capacity of 20 million tonnes/annum as it already has 8 million tonnes per annum pellet plant at Vizag in Andhra Pradesh. The company has 8 mt per annum iron ore beneficiation plant at Bailadila in Chhattisgarh.

Ispat Industries Ltd (IIL)

Ispat Industries Ltd with its associated companies has set up one of the largest integrated steel plants in the private sector in India at Dolvi, Raigad district in Maharashtra, having a capacity to produce 3 million tpy of hot-rolled coils (HRC). IIL also has sponge iron and pig iron plant of 1.6 million tpy and 2 million tpy capacity, respectively, in the Dolvi Complex. The Dolvi plant has been acquired by JSW Steel Ltd in December 2010. The company had recently commissioned 2.24 million tpy capacity sintering plant at Dolvi complex. The integrated steel plant is based on the electric arc furnace route to produce steel by using modern Twin Shell Electric Arc Furnace and CONARC process. The company has combined the use of hot metal and DRI (sponge iron) in the electric arc furnace for production of liquid steel for the first time in India. For downstream casting and rolling of the liquid steel, it has incorporated state-of-the-art compact strip production (CSP) process installed for the first time in India. The process yields high quality and specifically very thin grades of HRC. The company has proposed brownfield expansion project of 5 million tonnes of crude steel capacity and 2.8 million tonnes greenfield capacity in the state of Jharkhand.

Bhushan Power & Steel Ltd (BSPL)

Bhushan Power & Steel Ltd, although a new entrant in integrated steel making has over 37 years of experience in the steel sector, being a part of the erstwhile Bhushan Ltd. Its first integrated Steel Plant in Sambalpur district of Odisha is in operation with a total capacity of

0.68 million tpy DRI kilns; 0.70 million tpy blast furnace; 0.45 million tpy coke oven plant; 1 million tpy sinter plant; 1.2 million tpy steel making facility and 0.9 million tpy HR mill. The company has further plans to add sponge iron capacity of 1.02 million tpy and one million tpy of hot metal production .

The current configuration of Integrated Steel Plant at Odisha is to manufacture 2.30 million tpy steel through Blast Furnaces of 1008 m³ of 0.70 million tpy, with sinter plant of 1.00 million tpy. DRI Sponge kilns of 1.40 million tpy, one coke oven plant of 0.45 million tpy, CSP plant (HR Mill) of 1.70 million tpy, wire Rod & Bar Mill of 0.45 million tpy and Billet caster. Presently the company is manufacturing Sponge iron, Billets, Pig iron, HR Coils and CR coils/sheets in Odisha plant.

Bhushan Steel Ltd

The company earlier was known as Bhushan Steel and Strips Ltd and Bhushan Steel Ltd engaged in steel making and processing and allied activities. Currently, the company is implementing an integrated steel plant with 3 million tpy capacity and will further enhance the steel capacity to 6 million tpy. The company is a source for vivid variety of products like cold rolled steel, galvanised coil & sheets, colour coated coils, Galume sheets & coils (Al-Zn coated first time in India), Billets, sponge iron, wire rod etc. The company has three manufacturing units each in the states of Uttar Pradesh, Odisha and Maharashtra.

Monnet Ispat & Energy Ltd (MIEL)

The company is operating plant at Raipur in Chhattisgarh with 1.0 million tpy of finished steel and at Raigarh with 1.0 million tpy of sponge iron. The company is in the process of expanding its Raigarh Steel Complex to 3 million tpy by 2010-11. The entire facility will be integrated with primary steel manufacturing of one million tpy each of hot metal and DRI. It is setting up a 1.5 million tpy plant with a combination of plates, wire rods and also for catering to the high end construction sector. It has also plans to set up greenfield projects, viz, a 2 million tpy fully integrated steel plant in Angul, Odisha where the work for Phase I is already under progress, and another one million tpy steel plant in Bokaro, Jharkhand. These plants will enhance the capacity to 5 million tpy by 2012.

Performance of the EAF/IF industry is summarised below:

Electric Arc Furnace Industry (Mini Steel Plants)

Electric arc furnace industry (mini steel plants) has been playing an important role in overall production of steel in the country. There were 38 working units with 18.041 million tpy capacity. One unit with 0.05 million tpy capacity was closed. The aggregate commissioned capacity was 18.041 million tpy spread over 39 units. Production of secondary steel reported by the electric arc furnace units is given in Table-5.

Table – 5 : Secondary Steel Production from Electric Arc Furnace Industry

(In million tonnes)		
Category	2008-09	2009-10
Total	14.15	15.48
Mild steel	9.03	11.91
Medium/ High carbon steel	2.68	1.95
Alloy steel	1.05	0.81
Stainless steel	0.75	0.13
Others	0.64	0.68
Total reported	14.15	15.48
Total estimated	-	-

Source: Ministry of Steel, Annual Report 2010-11.

Induction Furnace

About 1114 units were in operation during 2009-10 with an installed capacity of 24.40 million tpy. The production reported in 2009-10 at 19.86 million tonnes was higher as against 18.05 million tonnes during 2008-09.

Modernisation and Other Capital Schemes

The Board of SAIL has given in principle to a proposal for modernisation and capacity expansion of Bhilai Steel Plant to 7.5 million tonnes of hot metal and 7 million tonnes of crude steel per annum. The proposal includes: a) Installation of a new blast furnace, b) A new 7 metre tall coke oven battery and a new sinter machine, c) Phasing out of ingot route with 100% continuous casting by adding a new steel melting shop of 4 million tonnes capacity, d) Installation of a universal beam mill of 1 million capacity, e) Addition of a new bar & roll mill of 0.9 million tonne capacity, f) Installation of a new universal rail mill of 1.2 million tonnes capacity, and g) capacity expansion of Plate mill to 1.42 million tonnes.

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IISCO Steel Plant is set to undergo modernisation-cum-expansion through which its hot metal production capacity will be raised to 2.91 million tonnes by 2011-12.

New Steel Projects

After the announcement of the Industrial Policy in 1991 and various other policy initiatives taken by the Government, substantial interest has been shown by several entrepreneurs in setting up new steel plants.

The National Steel Policy announced in November 2005 as a basic blue print for the growth of a self-reliant and globally competitive steel sector with a long term objective to ensure modern and efficient steel industry of world standards, catering to diversified steel demand. Pohang Steel Company (POSCO) is setting up 12 million tpy capacity steel plant in Odisha. Final clearance and approval from the central environment Ministry was accorded on 2.5.11 to the State Govt. of Odisha to give 1253 ha. (3100 acres) of forest to POSCO for its plant, with a condition on POSCO to regenerate an equal area of forest in an area decided by Odisha as well as paying for lands and the project will not be detrimental from ecological & local livelihood point of view. Other new steel plants for which MoUs have been signed, include: Kalinganagar, Odisha (6 million tpy); Bastar, Chhattisgarh (5 million tpy) and Manoharpur/Saraikella, Jharkhand (12 million tpy) of Tata Steel; Odisha (6 million tpy) and Jharkhand (5 million tpy) of Jindal Steel & Power Ltd. Besides, Bhushan Steel is reported to be setting up a 2 million tpy plant in West Bengal with a likely expansion to 5 million tpy in next five years along with a 500 thousand tpy cold rolling mill and galvanising unit for production of autograde steel. JSW Bengal Steel is in the process of setting up a 3 million tpy steel project in West Bengal. Arcelor Mittal has tentatively selected 3 sites for its Rs.40,000 crore mega steel project in Jharkhand and a similar project in Odisha. With the setting up of these new steel plants, contribution of private sector units is gradually increasing and this trend is expected to continue in the years to come.

Visa Steel Ltd (VSL) company was implementing 0.5 million tpy integrated special and stainless steel plant, and 400,000 tpy coke oven plant. The expansion plans include: 50,000 tpy ferro-chrome plant, a 3 lakh tpy coal-based sponge iron plant using Lurgi technology and an integrated 0.5 million tpy special and stainless steel plant at Kalinganagar, Jajpur district, Odisha. The company also has chrome

ore beneficiation plant and chrome ore grinding plant of one lakh tpy capacity, each.

National Mineral Development Corp. Ltd (NMDC)

Infrastructural works related to NMDC's iron & steel plant (NISP) near Nagarnar, Jagdalpur, Bastar district, Chhattisgarh are in progress. There was no agreement on contractual terms & conditions with TPE, Moscow for construction of Romelt shop based on Romelt technology. Action for selection of suitable alternative technology is on hand. The 3 million tonnes integrated steel plant will be backed by development of iron ore deposits in the same state. NMDC is also considering the techno-economic feasibility of setting up a two million tpy steel plant in Karnataka, through a joint venture with Russia's severstal. NMDC is also in a bid to acquire coal mine in the United States to secure coal for its captive needs. Sponge iron India Ltd has been merged with NMDC Ltd with effect from 1.7.2010.

KIOCL Ltd

KIOCL Ltd (formerly Kudremukh Iron Ore Company Limited) was renamed with effect from 22.1.2009. In addition to its present 2.27 lakh tpy pig iron plant at Panambur and the ductile iron spun pipe (DISP) project of 100,000 tpy capacity, the company was also in the process of selecting a joint venture equity partner for an integrated steel plant to be set up in Karnataka. The pellet plant at Mangalore has 3.5 million tonnes capacity and is now exporting iron ore pellets to China and for domestic units such as Ispat Industries Ltd, SAIL, Rashtriya Ispat Nigam Ltd. After the mining was stopped at Kudremukh w.e.f. 31.12.2005, the pellet plant is being operated with hematite iron ore purchased from NMDC. The company produced 1.27 million tonnes of pellets and 62,150 tonnes of pig iron (Panambur plant) during the year 2009-10. The third pig iron casting machine in blast furnace unit at Mangalore was being introduced during 2010-11 as expansion activity. The company also has plans to create permanent railway siding facility at Mangalore.

FERRO-ALLOYS

The Indian Ferro-alloy Industry was established during the second Five-year plan, as an ancillary industry to cater to the growing needs of the domestic steel industry.

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Ferro-alloys are essential inputs in production of ordinary steel, alloy steel and special steels. Broad-banding facility permits the ferro-alloys producers to shift their production from one ferro-alloy to another within its overall capacity depending on the market condition. With the liberalisation policy and delicensing in July 1991, it was possible for ferro-alloy producers to increase the production depending on indigenous and foreign demands. Bulk ferro-alloys of high carbon category were produced by large-scale industries. The noble ferro-alloys are of low carbon category and include ferro-vanadium, ferro-tungsten, ferro-niobium, ferro-molybdenum and ferro-titanium. There are also a number of units under the small-scale sector for the manufacture of ferro-alloys, particularly ferro-silicon, ferro-chrome and ferro-manganese.

There were about 158 units (including three 100% export-oriented units) having an annual installed capacity of over 3.64 million tonnes, against which the production in 2009-10 was about 2.51 million tonnes. The industry has already surplus capacity against the domestic demand. About 25 to 30% production is usually exported. India is an established regular exporter of silico-manganese and high-carbon ferro-chrome. During the year 2009-10, about 8.6 lakh tonnes of ferro-alloys were exported. As it is a highly power-intensive industry, the capacity utilisation has been around 62% during 2009-10. The capacity and production of ferro-alloys are furnished in Tables-6 and 7, respectively. The details about ferro-alloys are discussed in Ferro-alloys review.

Table – 6 : Capacity of Ferro-alloys Industry

(In tonnes per annum)

Ferro-alloys	Units (No.)	Installed capacity
Total	158	3640000
Bulk Ferro-alloys : Total	118	3600000
Manganese alloys	63	2100000
Chrome alloys	26	1300000
Ferro-silicon	29	200000
Noble Ferro-alloys : Total	40^(e)	40000^(e)

Source: Indian Ferro-alloys Producers' Association (IFAPA), Mumbai.

Table – 7 : Production of Ferro-alloys 2008-09 and 2009-10

(In tonnes)

Product	Production	
	2008-09	2009-10
Total	2220304	2514628
Bulk Ferro-alloys : Total	2192869	2483320
Ferro-manganese	384577	389465
Silico-manganese	891458	1099838
Ferro-silicon	99595	101917
Ferro-chrome/Charge-chrome	817239	892100
Noble Ferro-alloys : Total	27435	31308
Ferro-molybdenum	2162	2822
Ferro-tungsten	150	150
Ferro-vanadium	1501	1389
Ferro-silicon- zirconium	87	120
Ferro-silicon- magnesium	13400	17132
Ferro-nickel-magnesium	221	209
Ferro-aluminium	8170	7017
Ferro-titanium	1661	2379
Ferro-boron	83	90

Source: Indian Ferro-alloys Producers' Association (IFAPA), Mumbai.

Table – 8 : Capacity of Charge-Chrome Plants

Plant	Location	Installed Capacity (tpy)
Ferro-Alloys Corp. Ltd	Randia, Dist. Bhadrak, Odisha.	50,000
Tata Steel Ltd	Bamnipal, Dist. Kendujhar, Odisha.	55,000
Indian Charge Chrome Ltd	Choudwar, Dist. Cuttack, Odisha.	62,500
Total		167,500

Bulk Ferro-alloys

Ferro-manganese and Silico-manganese

Ferro-manganese is the most important ferro-alloy used in the steel industry. Total installed capacity of 21 lakh tonnes was in operation in the country. Out of these, 11 were major plants. Of late silico-manganese has gained more importance than ferro-manganese.

MOIL has constructed a plant for direct utilisation of manganese ore fines to produce ferro-manganese. The plant having 10,000 tpy capacity is located near Balaghat manganese mines in

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Madhya Pradesh. The company has signed a Memorandum of Understanding (MoU) for an agglomeration plant to utilise high grade (49% Mn) fines at Balaghat mines on a joint venture basis. The total production of ferro-manganese by MOIL was 9,555 tonnes in 2009-10.

Maharashtra Electros melt Ltd (MEL), a subsidiary of SAIL, situated in Chandrapur, Maharashtra, is a major producer of ferro-manganese and silico-manganese for captive use of SAIL's plants in the country. It was also diversifying production into other ferro-alloys.

Ferro-chrome and Charge-chrome

The total combined capacity of ferro-chrome and charge-chrome is around 13 lakh tpy producing about 892 thousand tonnes of ferro-chrome/charge-chrome in the country. Stainless and alloy-steel industry is the chief consumer of ferro-chrome.

The charge-chrome plants of Tata Steel, FACOR and Indian Charge-chrome Ltd have a total charge-chrome capacity of 167,500 tpy. All the three plants are 100% export-oriented units. FACOR is planning to set up a 500,000 tpy stainless steel plant at a cost of Rs.2,500 crore to further integrate the present ferro-chrome production. Plantwise capacity of charge-chrome is given in Table-8. The charge-chrome contains 50 to 60% chromium and 6 to 8% carbon. While chromium used in some alloy steels can be replaced by nickel, cobalt, columbium, vanadium or molybdenum, it is indispensable in the manufacture of stainless steel. Because of high cost and lower performance standards of nickel, cobalt, columbium, etc., chromium is preferred in alloy units too.

Ferro-silicon

The capacity was 2 lakh tpy producing around 102 thousand tonnes of ferro-silicon in the country. The highest production was from Eastern region which was around 61% of the total production.

Besides, ferro-alloys are also produced by small-scale units.

Noble Ferro-alloys

The total capacity was 40,000 tpy of noble ferro-alloys, such as ferro-molybdenum, ferro-vanadium, ferro-tungsten, ferro-titanium, ferro-

silico magnesium, ferro-aluminium, ferro-boron etc. Mishra Dhatu Nigam (A Govt. of India Undertaking), with a capacity of 2,729 tpy produced different types of super-alloys, chiefly cobalt, molybdenum, titanium and tungsten-based super-alloys and products. Noble ferro-alloys are mainly produced through aluminothermic process. Most of these units are in unorganised sector.

Electrolytic Manganese Dioxide (EMD)

EMD is consumed along with natural manganese dioxide during manufacturing dry battery cells. There were two units, one owned by MOIL in Bhandara district of Maharashtra, having a capacity of 1,000 tpy and the other by the then Union Carbide Ltd (now Eveready Ltd) at Thane, Maharashtra, having a capacity of 2,500 tpy. The later one is closed due to uneconomic conditions. MOIL has undertaken capacity expansion of the existing plant to 1,500 tpy, in view of the good demand for EMD in the domestic market. The plant of MOIL Dongri Buzurg has produced 1,150 tonnes EMD in 2009-10 as against 1,240 tonnes in 2008-09 exceeding the capacity utilisation in both the years. The company has plans to set up 10,000 tpy capacity electrolytic manganese metal (EMM) plant and 5,000 tpy capacity potassium permanganate plant, for diversification of value-added products.

NON-FERROUS METALS

Aluminium

There were five companies with a total installed capacity of 1.78 million tpy in operation. NALCO, a public sector company has an installed capacity of 402,500 tpy at Angul. NALCO has signed an MoU with Orissa Industrial Infrastructure Development Corporation (IDCO) to set up an aluminium park at Angul in Joint Venture (JV) at an estimated cost of 75 crore. The new JV company has name "Angul Aluminium Park Ltd" and it will set up an aluminium downstream & ancillary complex over an area of 200 acres. BALCO a joint sector company has an installed capacity of 3.5 lakh tpy at Korba. Three companies with five plants in the private sector have a total capacity of 1,378 tpy. The production of aluminium in 2009-10 was 14.81 lakh tonnes. The information on installed capacity and production of aluminium in 2008-09 and 2009-10 is given in Table-9.

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Table – 9 : Capacity and Production of Aluminium, 2008-09 and 2009-10

(In '000 tonnes)

Producer	Annual Capacity	Production	
		2008-09	2009-10
Total	1780.5	1347	1481
Public Sector			
National Aluminium Co.	402.5	362	396
Joint Sector			
Bharat Aluminium Co. Ltd	350	356	263
Private Sector			
Hindalco Industries Ltd	488	524	557
Madras Aluminium Co. Ltd	40	23	–
Vedanta Aluminium Ltd	500	82	264

Figures rounded off.

Source: Information received from individual plants/Annual reports.

Larsen & Toubro Ltd has decided to increase smelting capacity of their proposed aluminium plant in Odisha from 0.22 million tonnes per annum to 0.44 million tonnes per annum. L & T has formed a joint venture with Dubai Aluminium for its project.

Alumina

The information about alumina producers in the country, their capacities and production is given in Table-10. The production of alumina was 34.33 lakh tonnes in the year 2009-10. NALCO became one of the largest producers of alumina in Asia, with the expansion of alumina refinery capacity to 1.575 million tpy. Second phase expansion of alumina refinery is underway and the capacity will be enhanced by another 525,000 metric tonnes, making the total capacity to 2.1 million tpy. By 2014-15, in the 3rd phase of expansion, the capacity will be enhanced to 2.975 million tonnes.

GMDC has planned to set up a 0.75 million tpy alumina plant and a company, namely, Gujarat Alumina & Bauxite Ltd has been formed. The final decision regarding the selection of the joint venture partner is pending with the Government of Gujarat. The viability report of the project has been prepared and formalities for acquiring land were in progress.

Hindalco's Renukoot integrated smelter uses alumina produced in their plant for producing aluminium. Expansion of its Muri refinery from 110,000 tpy to 450,000 tpy was completed on schedule.

Table – 10 : Capacity and Production of Alumina, 2008-09 and 2009-10

(In '000 tonnes)

Producer	Capacity	Production	
		2008-09	2009-10
Total	4460	3620	3433
Public Sector			
National Aluminium Co.	1575*	1556	1320
Joint Sector			
Bharat Aluminium Co. Ltd	200	198	43
Private Sector			
Hindalco Industries Ltd	1500	1237	1307
Madras Aluminium Co. Ltd	85	43	Nil
Vedanta Aluminium Ltd	1100	586	762

Figures rounded off.

Source: Information received from individual plants/Annual reports.

* Expansion proposed from 1,575 thousand tonnes to 2,100 thousand tonnes.

National Aluminium Co. Ltd

The present capacity of bauxite mines of 4.8 million tpy, is being expanded to 6.3 million tonnes/annum in 2nd phase expansion. Alumina refinery of 15.75 lakh tpy is also being augmented to 21 lakh tonnes per annum and smelter from 4.025 lakh tpy to 4.6 lakh per annum. The second phase of expansion of bauxite mines and alumina refinery to 6.325 million and 2.275 million tpy, respectively, is underway. The company also produces special grade alumina and hydrate as also TPA detergent grade zeolite. These plants with 26,000 tpy and 10,000 tpy capacity, respectively, are integrated with the main stream at Damanjodi refinery. The second phase expansion of NALCO's captive power plant is from 960 MW to 1,200 MW is nearing completion. The company also proposes to set up 1.4 million tpy, alumina refinery near Vizag, Andhra Pradesh based on rights over two bauxite blocks in Andhra Pradesh, with 42 lakh tpy bauxite capacity mines. NALCO proposes to build a 5 lakh tpy aluminium smelter and 1260 MW power plant near Brajarajnagar, Jharsuguda district, Odisha. NALCO has signed an MoU with

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Nuclear Power Corporation of India Ltd (NPCIL) for establishment of Nuclear Power Plant in Joint venture mode in Gujarat.

Bharat Aluminium Co. Ltd

The Government of India disinvested its 51% equity in BALCO along with the transfer of management control in favour of M/s Sterlite Industries (India) Ltd. Now, BALCO is a joint sector company with an integrated alumina/aluminium complex at Korba in Bilaspur district in Chhattisgarh. The company has two captive bauxite mines, one at Mainpat and other at Bodai Daldali. It operates alumina plant with 2 lakh tpy capacity based on Hungarian technology and aluminium smelter of one lakh tpy capacity based on Vertical Stud Soderburg (VSS) technology to produce aluminium from alumina. The work on expansion from 2.50 lakh tpy to 3.50 lakh tpy smelter capacity was completed along with 810 MW Captive Thermal Power Plant (CPP) with an average unit cost of about Rs. 1.55 which is one of the lowest in the industry. Work on the new 325,000 tpy aluminium smelter was progressing and the first metal tapping was expected by March 2011. The downstream production facilities of BALCO included 111,500 tpy wire rods, 72,500 tpy rolled products, 8,000 tpy extrusions, 9,000 tpy other semi-finished products, etc. BALCO has another aluminium semis unit at Bidhanbag near Asansol in West Bengal. It has an installed capacity of 6,400 tpy which includes extruded and rolled products, foils and conductors. The company is in an advanced stage of planning for a brownfield 650,000 tpy smelter project; and a 1,200 MW captive power project is underway.

Hindalco Industries Ltd

With the completion of brownfield expansion, the capacity of Renukoot aluminium smelter is raised to 345,000 tpy, alumina refinery to 700,000 tpy. The Company has 55 kg per year capacity of gallium recovery at Renukoot. The Company has two captive power plants at Renusagar & Hirakud with total generation capacity of about 1109 MW. Hindalco is implementing 1.5 million tonnes capacity Alumina Project in Rayagada district, Odisha under the aegis of Utkal Alumina Limited, a joint venture with Alcan of Canada. The land has been acquired and mining lease for bauxite was obtained at Kodingamali. The 1.5 million tpy alumina refinery in Odisha is in an advanced stage of implementation. The company is planning a

359,000 tpy aluminium smelter near Bargawan in Sidhi district with 900 MW CPP in Mahan, Madhya Pradesh, which was expected to start production by July 2011. A coal block has already been allotted in joint venture with the Essar Power. An MoU has also been signed with Government of Jharkhand for a proposed 359,000 tpy capacity smelter and a 900 MW power plant. The company has applied for a coal block at Latehar. The company's Aditya Alumina & Aluminium Project with 1.5 million tpy alumina and 359,000 tpy aluminium capacity along with 900 MW CPP is also on schedule. The commissioning of smelter is expected by end of 2012.

All the business of INDAL, including Aluminium Foils Division at Kollur, Andhra Pradesh has been transferred by way of demerger to Hindalco. The Company has completed expansion of Muri refinery from 110,000 tpy to achieve 450,000 tpy alumina capacity with backward integration of new bauxite mines in Odisha and Jharkhand. The further augmentation of the smelting capacity at Hirakud to 100,000 tpy was completed through Prebake technology. Phase-II of expansion to 155,000 tpy was underway and reached 143,000 tpy. With the commissioning of the second 100 MW captive power plant at Hirakud, dependence on grid power is eliminated resulting in significant cost savings. An additional 100 MW power plant was added in 2008. Similarly, Belgaum refinery is to be expanded from 350,000 tpy to 650,000 tpy. However, the plans are on hold awaiting government's approvals relating to bauxite mines. Special alumina capacity at this plant is expanded to 138,000 tpy and is to be further raised to 316,000 tpy. The company produces approximately 120 grades of speciality alumina products.

Vedanta Group

Vedanta Aluminium Ltd has commissioned greenfield alumina refinery at Lanjigarh, district Kalahandi, Odisha, in March 2007, at an investment of Rs.4,000 crore. The refinery with 1.1 million tpy capacity is located close to bauxite mines in Kalahandi district and expected to reach 5 million tpy capacity in near future. The 500,000 tpy capacity smelter with a 9x135 MW coal-based captive power project coming up at Jharsuguda in Sambalpur district was commissioned in May 2008. Pechiney Aluminium Engineering of France is the technical collaborator.

Ashapura Group

Ashapura Minchem will set up an alumina complex with an investment of Rs. 4,200 crore at Ratnagiri, Maharashtra. The project has been granted 'Mega Project' status by Maharashtra Government and the proposed project will have 5 lakh tpy alumina refinery and 1.5 lakh tpy aluminium smelter and a 330 MW captive power plant. The company plans to export alumina to Middle East countries.

Cadmium

Cadmium (99.95 min) is obtained as a by-product from zinc smelters of HZL at Debari, Visakhapatnam, Chanderiya and of BZL, Binanipuram. These together have an annual capacity of 913 tonnes. The capacity and production of cadmium are furnished in Table-11.

Table – 11 : Capacity and Production of Cadmium

(In tonnes)

Producer	Annual capacity	Production	
		2008-09	2009-10
Total	913	507	553
HZL	833	470	485
Binani Zinc Ltd	80	37	68

Source: Individual plants.

Copper

HCL, a public sector company, was the only producer of primary refined copper till 1997. The installed capacity for refined copper production at HCL's two integrated smelters is around 51,500 tpy. The other two producers of primary copper now are Hindalco Industries Ltd and Sterlite Industries of Vedanta Group, having annual capacities of 500,000 tonnes and 400,000 tonnes of refined copper, respectively. The total installed capacity is thus 1,001,500 tpy. The other two smelters of Metdist and Jhagadia Copper Ltd (formerly SWIL) having a total capacity of 2 lakh tpy were under installation, the latter having become operational with 50,000 tpy capacity. Details regarding capacity and production are given in Table-12.

Production of refined copper (cathodes) in 2008-09 and 2009-10 was 513,640 tonnes and 532,865 tonnes, (provisional) respectively.

Table – 12 : Capacity and Production of Copper

(In '000 tonnes)

Producer	Annual capacity	Production*	
		2008-09	2009-10(P)
Total	51.500	513.64	532.86
Hindustan Copper Ltd	51.5	30.03	15.86
Sterlite Industries (India) Ltd.	400.0	173.12	180.14
Hindalco Industries Ltd	500.0	297.79	333.36
Jhagadia Copper Ltd (formerly SWIL)	50.0	12.67	3.49

Source: Annual Reports, 2009-10 & non-statutory returns.
* Relates to copper cathodes.

Hindustan Copper Ltd

Copper is produced at two smelters of HCL at ICC, Ghatsila in Jharkhand and Khetri in Rajasthan. The aggregate capacity of the two smelters for copper cathode production is 51,500 tpy. Refinery at ICC also has a Wire Bar Casting Plant with a capacity of 84,000 tpy and a Brass Rolling Mill for manufacturing brass sheets by using copper produced at ICC. The aggregate installed capacity of wire bars is 39,400 tpy and wire rod capacity is 60,000 tpy at HCL. It has also a precious metal recovery plant for the recovery of gold, silver, selenium, tellurium and nickel sulphate and copper sulphate at Ghatsila. The company has prepared action plan to expand its mining capacity from existing level of 3.4 million tonnes/annum to 12.4 million tonnes/annum by 2016-17.

The capacity of Khetri Copper Complex (KCC) smelter is 31,000 tpy. KCC has a concentrator plant at Khetri in Jhunjhunu district, Rajasthan, having a capacity of 2.02 million tpy. KCC and Ghatsila Jharkhand with 1.55 million tpy, Malanjhand, MP with 2.00 million tpy capacity also has a sulphuric acid plant.

Continuous Cast Copper Wire Rods Project, Talaja, Maharashtra: This project has a capacity of 60,000 tpy continuous cast copper wire rods. The plant is based on the Southwire SCR-2000 technology of the USA, which uses natural gas as fuel and imported copper cathodes.

Sterlite Industries (India) Ltd (SIIL)

The smelter and refinery of Sterlite Industries (India) Ltd are located at Tuticorin in the coastal belt of Tamil Nadu and Silvassa, Dadra & Nagar

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Haveli and has a total installed capacity of 4 lakh tpy each. The unit is based on 'ISASMELT' technology from MIM, Australia, using imported concentrates. A Cathode Refinery of 205,000 tpy capacity and 90,000 tpy Copper Rod Plant have been built at Tuticorin with a view to making exports from the nearby port. The 195,000 tpy copper cathode refinery of Sterlite is located in Chinchpada at Silvassa in Dadra & Nagar Haveli for catering to domestic market along with a 150,000 tpy rod mill. The total capacity of cathode & anode refineries stands at 8 lakh tpy. Out of the total 4 lakh tpy each capacity of copper anodes and cathodes at Sterlite, 195,000 tpy anodes are refined into cathodes at Silvassa for domestic markets, while remaining 205,000 tpy anodes are refined to cathode at Tuticorin itself for exports. The technology for refineries and Continuous Cast Copper Rod Plant is derived from MIM, Australia and Continuous Properzi, Italy, respectively. The imported copper concentrates for smelters are obtained from captive mines in Australia through long-term contracts with producers in Chile and Indonesia, as also through spot purchases. The company is the largest producer of Continuous Cast Copper Rods (CCR) in India. The CCR plants have total annual capacity of 268,000 tpy. The company has sulphuric acid plant of 1.3 million tpy and phosphoric acid plant of 230,000 tpy.

Hindalco Industries Ltd

The company's three copper smelters located at Dahej, Lakhigam, Bharuch district, Gujarat has an installed capacity of 500 thousand tpy. The copper operations consist of producing copper through smelting, refining copper from copper concentrates and converting refined copper cathode into continuous cast rod. It is now one of the world's largest smelters at a single location. It is based on Outokumpu technology. The company also produces continuous cast copper rods (CCR) with an annual capacity of 97,200 tonnes. In the process of extraction of copper metal, by-products being recovered and their annual installed capacities are: sulphuric acid (1.67 million tpy), phosphoric acid (180,000 tpy), di-ammonium phosphate (DAP) & complex fertilizers (400,000 tpy), gold (15 tpy) and silver (150 tpy). The entire requirement of copper concentrates is being met through imports supported by company's two copper mines in Australia.

Jhagadia Copper Ltd (formerly SWIL Ltd)

The company is the largest producer of LME grade 'A' copper cathodes using mainly

secondary route. It is located at Jhagadia in Bharuch district, Gujarat. It is a scrap-based electrolytic smelter to make cathodes with a capacity of 50,000 tpy and additional 20,000 tpy of copper anodes. The plant was in technical collaboration with Outokumpu Technology (formerly Boliden Contech AB), Sweden. The plant started operations and had produced 3,494 tonnes copper cathodes in 2009-10, as against 12,674 tonnes during the year 2008-09. The precious metals like gold, silver, platinum, palladium etc. are also recovered as part of anode slime during refinery.

METDIST Industries Ltd

The company was in the process of setting up a 150,000 tpy copper smelter and refinery complex at Rampara-Rajula in Amreli district, Gujarat, with technical collaboration of Mitsubishi, Japan.

Lead

The total installed capacity of lead smelting was 85,000 tpy excluding secondary lead which was 24,000 tpy. Primary lead was produced entirely by HZL at lead-zinc smelter at Chanderiya, Chittorgarh district, Rajasthan. Tundoo lead smelter, Dhanbad district, Jharkhand with capacity of 8,000 tpy was decommissioned by HZL in May 2003 due to economic non-viability. The total production of primary lead in the country in 2008-09 and 2009-10 was 60,323 tonnes and 64,319 tonnes, respectively.

Secondary lead capacity is held by the Indian Lead Pvt. Ltd at its two units at Thane in Maharashtra and Kalipark in West Bengal. The installed capacity of these two plants was 24,000 tpy. There are a number of other secondary producing units in organised and unorganised sector.

Zinc

India has a total installed zinc capacity of 917,000 tpy distributed between HZL smelters at Debari, Visakhapatnam, Chanderiya, Dariba and Binani Zinc Ltd's (BZL) plant at Alwaye in Kerala. HZL's Dariba hydro-zinc smelter with 210,000 tpy capacity was commissioned in March 2010. BZL has an annual installed capacity of 38 thousand tonnes zinc along with 80 tonnes cadmium and about 53,000 tonnes sulphuric acid.

Debari and Vizag zinc smelters of HZL have a capacity of 88,000 tpy and 56,000 tpy, respectively. At Chanderiya, the zinc smelter has 525,000 tpy

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capacity after 80,000 tpy zinc debottlenecking was completed at Chanderiya smelter complex and Debari zinc smelter in April 2008. Chanderiya smelter complex with a total capacity of 525,000 tpy of zinc is the world's largest single location zinc smelting complex. Besides lead and zinc, HZL is also producing silver, cadmium, copper and sulphuric acid as by-products. The annual installed capacities for these by-products are 168 tonnes silver, 833 tonnes cadmium ingots, 2,100 tonnes copper cathode and 1.34 million tonnes sulphuric acid. The Visakhapatnam zinc smelter, apart from utilising imported concentrates can process sludge, containing about 16% zinc, arising out of the existing zinc smelters at Debari and Alwaye. HZL had undertaken Phase-II expansion projects, which include 170,000 tpy hydro metallurgical zinc smelting plant and matching mine expansion and one 80 MW captive power plant. The domestic production of zinc ingots by HZL in 2008-09 and 2009-10 was 551,723 tonnes and 578,412 tonnes, respectively.

Besides, there are secondary zinc producing units in unorganised sector with capacity of 45,000 tpy. However, production related data from these units is not available.

The data on total capacity and production of primary lead and zinc in 2008-09 and 2009-10 are furnished in Table-13.

ABRASIVES

Natural abrasives, which include calcite, emery, diamond, zircon, corundum, novaculite, pumice, etc. are generally sold as dressed stones. Synthetic abrasives include borazon, ceramic, dry ice, glass powder, silica carbide etc. Commercial abrasives are manufactured in many shapes as bonded or coated abrasives including belts discs, wheels, sheets, blocks, rods & loose grains. Important producers of coated abrasives are Grindwell Norton Ltd, Mora, Uran, Raigad district, Maharashtra; Flexoplast Abrasives (India) Ltd, Aurangabad, Maharashtra; Associated Abrasives Ltd, Nasik, Maharashtra; Carborundum Universal Ltd, Chennai, Tamil Nadu; Cutfast Abrasives Tools Pvt. Ltd, Chennai, Tamil Nadu; John Oakey and Mohan Ltd, Gaziabad, Uttar Pradesh; and K. L. Thirani & Company Ltd, Kolkata. Important producers of bonded abrasives (grinding wheels) are Grindwell Norton Ltd, Mora, Uran, Raigad district, Maharashtra; Associated Abrasives Ltd, Nasik, Maharashtra; Carborundum Universal Ltd, Chennai, Tamil Nadu; Cutfast Abrasives Tools Pvt. Ltd, Chennai, Tamil Nadu; Industrial Abrasives Co-operative Society Ltd, Mumbai, Maharashtra; and K. L. Thirani & Company Ltd, Kolkata, West Bengal.

Table – 13 : Capacity and Production of Primary Lead and Zinc

(In tonnes)

Producer	Lead capacity (tpy)	Production		Zinc capacity (tpy)	Production	
		2008-09	2009-10		2008-09	2009-10
Hindustan Zinc Ltd	85,000	60323	64319	879000	551723	578412
Binani Zinc Ltd	–	–	–	38000	27368	35552
Total	85,000	60323	64319	917000	579091	613964

Source: Annual Report, HZL, 2008-09 and 2009-10.

New Projects

The Government of India had approved setting up a new zinc smelter of 100,000 tpy capacity at Kapasan in Chittorgarh district, Rajasthan by HZL. The 210,000 tpy, hydrometallurgical zinc smelting plant was commissioned in March 2010 while 100,000 tpy lead plant at Rajpura Dariba is on course. The company will also add 2 x 80 MW captive power plants at Rajpura Dariba. Silver production is also expected to increase to 500 tpy.

Silicon Carbide

Major producers of silicon carbide are Grindwell Norton Ltd, Renugunta, Andhra Pradesh and Bangalore, Karnataka; Indian Metals & Carbide Ltd, Therubali, Odisha; and Carborundum Universal Ltd, Tiruvottiyur, Chengalput district, Tamil Nadu.

CEMENT

Cement, which is a key infrastructure industry, has been growing since the decontrol of price

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and distribution in 1989 and delicensing of the industry and policy reforms in 1991. India is the second largest manufacturer of cement in the world. In 2009-10, the cement industry comprised 172 large cement plants with an installed capacity of about 270.77 million tonnes and about 350 operating mini-cement plants with an estimated capacity of about 6 million tonnes per annum. Thus, total cement installed capacity in the country is about 276.77 million tonnes per annum. Three cement plants having total capacity of 990,000 tpy producing white cement were also functional. The number of plants and capacity is more in southern region (Andhra Pradesh, Tamil Nadu, Karnataka and Kerala) of the country, followed by western region (Gujarat and Maharashtra). The CCI, a central public sector undertaking, has 10 units with a total capacity of about 3.85 million tonnes. These 10 units are spread over 8 States/Union Territories located at Mandhar & Akaltara in Chhattisgarh, Nayagaon in Madhya Pradesh, Kurkunta in Karnataka, Bokajan in Assam, Rajban in Himachal Pradesh, Adilabad & Tandur in Andhra Pradesh, Charkhi Dadri in Haryana and Delhi grinding unit in Delhi. Except Bokajan, Rajban and Tandur units, the rest are non-operational due to various reasons. The company was reviewed in light of public sector policy under National Common Minimum Programme (NCMP) and restructuring/revival plan approved by the Government is under implementation. Technology upgradation of Tandur unit and expansion of Bokajan has been taken up for implementation as a part of the sanctioned scheme. There were 6 large cement plants owned by various State Government Undertakings. There were as many as 112 plants with a million tonnes or more capacity. The production of cement (all kinds) in 2009-10 was 204.95 million tonnes, including about 4 million tonnes from mini cement plants. The cement industry has thus recorded a positive growth.

The Cement Industry was going ahead with modernisation and upgradation of technology particularly in energy conservation. The country is self sufficient in cement. India exports cement including white cement and clinker.

The growth in construction and infrastructural activities in the country has ushered a fresh wave of consolidation in the industry. The Working Group on Cement Industry constituted by Planning Commission for the 11th Plan period has projected a demand growth for cement at the rate of 11.5% per annum based on expected 9% GDP growth rate. The additional cement capacity

during 11th Plan is projected as 112 million tpy - 80 million tpy from greenfield plants and 32 million tpy through brownfield expansions and technology upgradation. The annual capacity and production of cement by the end of 11th Plan are estimated at 320 million tonnes and 269 million tonnes, respectively, with 90% capacity utilisation. The domestic cement industry may not keep promise of adding targeted capacities due to problems like land acquisition, equipment supply delay, liquidity crunch and more importantly the unexpected slow growth rate in cement demand with squeezing margins and pricing under pressure in the recent global recession.

ASBESTOS-CEMENT PRODUCTS

The installed capacity of asbestos-cement pressure pipes in the organised sector was 149,640 tpy. Production capacity of asbestos cement sheets was not available. The production of asbestos-cement sheets and accessories in 2009-10 was about 2.4 million tonnes. The production of asbestos-cement pressure pipes was about 150 thousand tonnes during the same period.

The operating units comprised four units of Everest Building Products Ltd. located at Kymore in Madhya Pradesh, Mulund in Maharashtra, Podanur in Tamil Nadu and Kolkata in West Bengal; three plants of Hyderabad Industries Ltd at Sanatnagar, Ranga Reddi district in Andhra Pradesh, Jasidih in Jharkhand and Ballabgarh in Haryana; three units of Ramco Industries Ltd at Arakkonam, North Arcot district, Tamil Nadu, Karur in Dharwad district, Karnataka and Maksi in Shajapur district, Madhya Pradesh; two units of Southern Asbestos Cement Ltd at Karur in Dharwad district, Karnataka and Arakkonam, North Arcot district in Tamil Nadu; Shree Pipes Ltd Hamirgarh, Bhilwara district, Rajasthan; Malabar Building Products Ltd, Malakunnathukavu, Thrissur district, Kerala; Konark Cement and Asbestos Industries Ltd at Bhubaneswar in Odisha; Shri Digvijay Cement Co. Ltd, Digvijaynagar, Ahmedabad in Gujarat; Uttar Pradesh Asbestos Ltd, Mohanlalganj, Lucknow district, Uttar Pradesh; Assam Asbestos Ltd, Bonda, Narangi, Guwahati district, Assam; Utkal Asbestos Ltd, Dhenkanal in Odisha and

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Visaka Asbestos, Pattencheru (Medak) in Andhra Pradesh.

Besides, Swastik Industries, Pune in Maharashtra; Kalani Asbestos, a Division of Kalani Industries Pvt. Ltd, Pitampur, Dhar district in Madhya Pradesh; Tamil Nadu Asbestos (Pipes), a unit of Tamil Nadu Cement Corp. Ltd, Mayanur, Tiruchirapalli district in Tamil Nadu and Ganga Asbestos Cement Ltd, Rae Bareli in Uttar Pradesh produced only asbestos pressure pipes.

REFRACTORY INDUSTRY

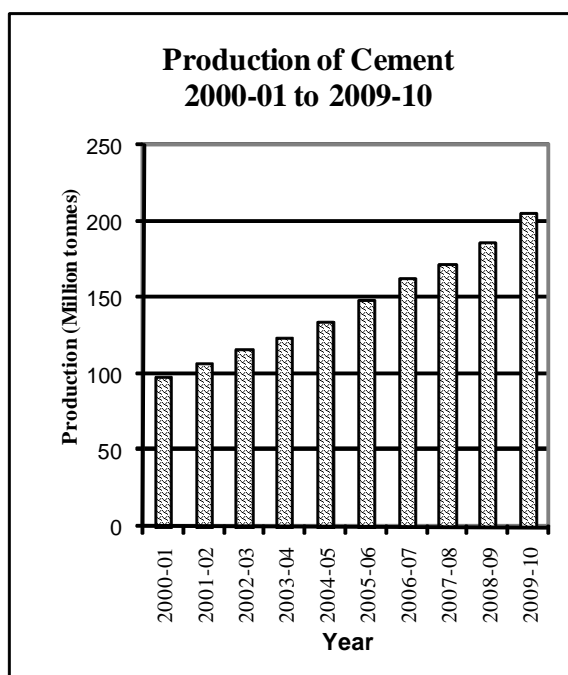
Steel industry comprises the biggest group of customers for this industry, which consumes about 70-80% of total refractory production, followed by aluminium, power and cement. Refractory units fall in medium and small-scale sectors. This industry has been facing recession mainly because of shift in demand from conventional refractories to sophisticated refractories. Bharat Refractories Ltd (BRL), a Govt. of India Undertaking (incorporated on July 22nd, 1974), having four units and engaged in the manufacture & supply of various kinds of refractories not only to the integrated steel plants but also to the smaller steel plants is being merged with SAIL with some major relief and concessions.

With the modernisation and renovation of the steel plants, requirements for various types of refractories have undergone revolutionary changes. The stress is now on more sophisticated products like precast monolithics. The domestic refractory industry, anticipating this change, has obtained technical know-how for the production of sophisticated refractories, such as magnesia carbon bricks, new generation sliding-gate plate refractories, for ladles, gunning materials and castables. Manufacture of carbon bonded silicon carbide crucible and clay graphite foundry products continue to be further upgraded for improvement in the products. The use of these special refractories has brought down the consumption of refractories per tonne of steel production. However, the customers are benefited by way of improved performance, lower shut down time and savings on energy. About 30 kg refractory was consumed per tonne of liquid steel a decade ago has now come down to around 7-8 kg per tonne of crude steel by some leading

players. The specific consumption of refractories at present in integrated steel plants varies from 8 to 19 kg/tonne of crude steel as compared to 6-8 kg/tonne of crude steel in advanced countries.

The total production of refractory items as per IRMA, in 2008-09 and 2009-10 was static at about 1.25 million tonnes. Exports of refractory bricks/firebricks during 2008-09 and 2009-10 were around 730 thousand tonnes and 359 thousand tonnes, respectively, as per DGCI & S data. Exports of other refractory manufactures during the same period were 132 thousand tonnes and 115 thousand tonnes, respectively. Imports of refractory bricks/firebricks during the corresponding period were 779 thousand tonnes and 294 thousand tonnes, respectively, while those of other refractory manufactures in the same period were 73 thousand tonnes and 38 thousand tonnes, respectively. The estimated annual installed capacity of different kinds of refractories and production is given in Table-14.

The increasing globalisation of refractories business could take an interesting turn in the coming years, as India emerges the most important market only next to China. Competition would intensify from lower end products like fire bricks to high end black refractories with overseas firms entering Indian market with advanced



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technologies and easier access to raw materials mainly from China.

In the Indian context, to meet the present operating conditions of the steel plants and to produce cost-effective steel, refractory industries should also upgrade their plants and products to meet present demand. This can be achieved mainly by way of refractory management instead of sale of individual items of refractory.

Table – 14 : Annual Installed Capacity and Production of Refractories (By Types)

(In '000 tonnes)

Refractory item	Annual capacity	Production	
		2008-09	2009-10
Firebricks refractories	560	309	304
High alumina refractories	553	342	358
Silica refractories	57	68	71
Basic refractories	454	224	233
Special products	46	44	45
Others(incl.Monolithics)	343	265	241
Total	2013	1252	1252

Source: Indian Refractory Makers' Association (IRMA) Journal, June 2011.

CERAMIC & GLASS INDUSTRY

Ceramic Industry

Ceramic industry in India is about 100 years old. India ranks 5th in world in terms of production of ceramics and produced 355 million sq metres of ceramic tiles. It comprises ceramic tiles, sanitaryware and crockery items. It has been growing at the rate of about 12% per annum. Ceramic products are made from clay and felspar and are manufactured in large and small-scale sectors with wide variations in type, range, quality and standard. Ceramic items have properties, such as glassy smooth finish, high thermal shock resistance, poor thermal and electrical conductivity, high abrasion resistance, acid resistance and weather resistance. During the last two decades, there has been a phenomenal growth in the field of ceramics to meet specific demands of industry, such as high alumina ceramics, cutting tools and other structural

ceramics. The state-of-the-art ceramic goods are being manufactured in the country and the technology adopted is of international standard. The major industries include Kajaria Ceramics, Somani Ceramics, Asian Granite India, Orient Ceramics & Industries, Regency Ceramics, Euro Ceramics, Bell Ceramics, Murudeshwar Ceramics, Ajanta Manufacturing etc. The per capita consumption of ceramic tiles in the country was about 0.3 sq m compared to 2 sq.m in China & 5-6 sq m in Europe. Ceramics Technological Institute (CTI), Bangaluru, a National Level Institute for R & D in BHEL has an objective to support the Indian Ceramic industry in modernising its technology and to develop new products of advanced ceramics. Areas of research are Nano-technology, separation technology, micro-wave processing, etc.

Ceramic Tiles

Ceramic tile is a common consumer item. Following the development and growth of the building industry, ceramic glazed tiles industry is on the threshold of rapid growth/expansion and its demand has increased considerably during the last decade. India ranked seventh in the world in production of ceramic tiles. In terms of tonnage, India produced 1.454 million tonnes of glazed tiles/ceramic tiles in 2009-10. There were 16 units in the organised sector with an installed capacity of 21 lakhs tonnes accounting for about 2.5% world ceramic tile production besides about 200 units in SSI sector. The domestic ceramic tile industry has been growing at about 12% per annum. Indian tiles are competitive in the international market and are being exported to East and West Asian countries. The exports during 2009-10 were worth Rs. 259.22 crore.

Sanitarywares

Sanitarywares are ceramic products used for hygienic services, like wash basins. The basic raw materials for sanitaryware are felspar, ball clay, kaolin and quartz. There were 7 units having an installed capacity of 143 thousand tpy in the organised sector and around 210 plants covering a capacity of 53,000 tpy in small-scale sector. Some units have either been closed or merged with the existing units. This industry has been showing a

growth rate of about 5% per annum. The major industries include Hindustan Sanitary Industries Ltd, Roca bathroom products, Cera Sanitaryware, Neycer India, etc. In 2009-10, the exports of sanitaryware were to the tune of Rs.15,776 crore.

Potteryware

Potteryware signifying crockery and tableware are produced both in the large-scale and the small-scale sectors. There were 16 units in the organised sector with a total installed capacity of about 43,000 tpy. In the small-scale sector, there were over 1,400 plants with a capacity of 3 lakh tpy.

Glass Industry

Glass industry is delicensed and manufacturing units are spread all over India. The large-scale producers are located mostly at Mumbai, Kolkata, Bangalore, Hyderabad and in Gujarat. They are equipped mostly with modern melting furnace technology, whereas the medium and small-scale industries including cottage industries are still using outdated technology. There is considerable scope in demand for glass fibre products particularly due to growth in petrochemical sector and allied products. Glass industry in India remained in the form of cottage industry till the beginning of 20th century. First glass plant in India was set up in August 1908 by freedom fighter Lokmanya Bal Gangadhar Tilak at Talegaon in the state of Maharashtra. Glass industry in India has made a steady progress since then, particularly after independence. Firozabad, a glass city of India continues to be a place of master craftsmen and entrepreneurs, manufacturing a vast variety of glass items by the traditional process. Side by side, the country has the most modern plants producing glass containers, float glass etc. by the use of latest technology. The major players include Saint-Gobain Glass India, Asahi India Glass, Gujarat Guardian etc.

The per capita consumption of glass in India is about 0.4 kg, compared to 3.5 kg in a country like Indonesia. Principal raw materials used in the manufacture of glass are silica sand, soda ash, calcite, dolomite, etc.

The production of bottles/bottle glassware during year 2008-09 and 2009-10 was about

903 thousand tonnes and 897 thousand tonnes, respectively.

The glass industry comprises glass containers and hollow-ware, tableware, flat glass (including float, sheet, figured, wired and safety, mirror glass), vacuum flasks, refills, laboratory glassware, fibre glass, hollow-ware containers, etc.

Glass Container and Hollow-ware

Presently, 43 units in the organised sector are engaged in the manufacture of glass containers and hollow-wares, with an installed capacity of around 15 lakh tonnes per year. Glass containers are ideal packaging medium, but are being replaced by other packaging materials like plastic, PET, aluminium and tetrapack. The per capita consumption of container glass in India is 1.4 kg compared to 27.5 kg in USA & 10.2 kg in Japan. The major producers include Hindustan National Glass & Industries, Piramal Glass, Haldy Glass Gujarat, LaOpala RG, Mohan Meakin etc. Out of these, there are 8 float glass lines with total installed capacity of 4700 tonnes/day. The major consumers are Architectural (85%), Automotive (10%), per capita consumption of float glass in India is 0.88 kg as against 12 kg in China, 9 kg in Thailand, 13 kg in Malaysia.

Laboratory Glassware

There were six units in this sector which comprises neutral glass tubing, laboratory glassware and chemical process equipment. The installed capacity of neutral glass tubing was 46,600 tpy. The data on production are not available. The demand for natural glass tubing has not picked up due to sizeable switch over from glass items to plastic items.

Flat Glass

The term flat glass includes float glass, sheet glass, figured and wired glass. These are further processed into mirror, toughened glass, laminated glass, double glazing, etched glass, glass doors, etc. Thirteen units in flat glass sector had a total production capacity of 135 million sq m. Out of these, there are 8 float glass lines with total installed capacity of

4700 t/day. The major consumers are Architectural (85%), Automotive (10%). Per capita consumption of float glass in India is 0.88 kg as against 12 kg in China, 9 kg in Thailand, 13 kg in Malaysia. Both, sheet and float glasses are being exported.

Vacuum Flasks and Refills

There were eight units in the organised sector for the manufacture of vacuum flasks and refills, with an installed capacity of 36 million numbers per annum. However, data on production are not available. This product is facing survival problems due to competition from international market.

Fibre Glass

Fibre glass is highly capital and technology-intensive industry. The present demand is about 22,000 tonnes. Fibre glass is lighter than aluminium but stronger than steel. Moreover, being an inorganic material, it does not pose any health hazard. Five units had a production capacity of 55,000 tpy. However, data on production are not available. Presently, India exports 80% glass fibre production.

GRANITE INDUSTRY

Granite is used in monuments, building slabs, tiles, surface plates, etc. Over 160 varieties of granite have been identified for processing as products for exports and the deposits are dispersed widely in all parts of the country.

Granite is a minor mineral as defined in MMDR Act, 1957. Granite Conservation and Development Rules, 1999 were notified separately on 1.6.1999 for ensuring systematic/scientific mining, development and conservation of valuable granite assets of the country.

Granite is a non-scheduled industry and the processing of granite is an age-old phenomenon started in 1930s. The mining and processing techniques of granite adopted in the country have improved over the years. Entrepreneurs are required to submit only Industrial Entrepreneur Memorandum to Secretariat for industrial assistance. Looking at its export potential, the Government of India has been encouraging setting up of 100% EOU in this sector to promote export

of value-added granite products. Exports of granite are freely allowed. The total value of granite exports during 2009-10 was Rs. 4,994 crore, next to diamond and iron ore during 2009-10. Aro granite Industries, Pokarna Tamil Nadu Minerals, Madhav Marbles & Granites Limited are some of the major players.

CHEMICALS

Caustic Soda

Caustic soda is a basic inorganic chemical used in the manufacture of pulp and paper, viscose rayon, textile, vanaspati and other chemicals and aluminium extraction. A significant quantity of caustic soda is used in the manufacture of other inorganic chemicals and dyestuffs, in metallurgical operations and in petroleum refining. Capacity and production of caustic soda in 2009-10 were 2.65 million tonnes and 2.61 million tonnes, respectively. The major producers are Gujarat Alkalies & Chemicals, Grasim Industries, DCM Shriram consolidated, DCW, Reliance Industries, Aditya Birla Chemicals (India) etc.

Soda Ash

Soda ash is an important chemical used widely as a raw material in the manufacture of glass and glassware, sodium silicate, textile, paper and pulp and in the preparation of a host of chemicals. Washermen use it largely as a washing material in laundries as also in households. The major soda ash producers are Tata chemicals, Gujarat Heavy Chemicals Ltd, Nirma, Saurashtra Chemicals, DCW, etc. The manufacture of Soda Ash in India started in 1932 at Dhaarangadhra in Gujarat with installed capacity of 50 tpd. Installed capacity and production of soda ash in 2009-10 were 2.6 million tonnes and 2.04 million tonnes, respectively.

Bleaching Powder

Seven units were engaged in producing stable bleaching powder. There were three units engaged in the manufacture of liquid bleaching powder.

Calcium Carbide

The capacity and production of calcium carbide were reported at 142,350 tonnes and

23 thousand tonnes, respectively, in 2009-10. Calcium carbide is used in the manufacture of acetylene gas. It is also used as a raw material for manufacturing various rubber goods. It is self-reinforcing filler.

Nickel Sulphate

Ghatsila copper smelter of HCL produces nickel sulphate as a by-product from electrolytic copper spent solutions. The annual capacity of HCL smelter for the production of nickel sulphate is 390 tonnes. However, no production has been reported since 2004-05 onwards. Other manufacturers were Phonics Chemicals Works (Pvt.) Ltd, Mumbai; Kesar Sugar Works, Mumbai; Ronuk Industries, Mumbai; Sen & Pandit Industries, Kolkata; Arim Metals Industries Pvt. Ltd, Kolkata; and Shambhunath & Sons, Amritsar, Punjab. Jhagadia Copper Ltd (formerly SWIL Ltd) has plans to recover nickel sulphate at its copper metal plant at Jhagadia, Bharuch district, Gujarat. Tuticorin plant of sterlite has developed innovative method to produce pure commercial grade nickel sulphate from electrolyte by solvent crystallisation. The pilot-scale trials are in progress.

Synthetic Cryolite (Na₃AlF₆)

Navin Fluorine Industries, Bhestan, Gujarat, is an important producer of synthetic cryolite. Other producers are Tanfac Industries Ltd, Cuddalore, Tamil Nadu; Dharamsi Morarji Chemicals Co., Ambarnath, Mumbai; and Adarsh Chemicals and Fertilizers Ltd, Udhana, Gujarat.

Aluminium Fluoride

Sterlite Industries (I) Ltd's copper division is in the process of setting up a 13,000 tpy aluminium fluoride plant through hydrofluorosilicic acid route with a joint venture partner, in and around Tuticorin, Tamil Nadu. Important units producing aluminium fluoride were Navin Fluorine Industries, Dharamsi Morarji Chemicals Ltd, Tanfac Industries Ltd, SPIC and Aegis Chemicals Industries Ltd. The total production of aluminium fluoride in 2009-10 was about 27 thousand tonnes against an installed capacity of more than 27 thousand tpy.

Titanium Dioxide

Four plants have reported an installed capacity of 237 thousand tpy to produce synthetic rutile while four plants have total installed capacity of 77 thousand tpy to produce titanium dioxide pigment. Synthetic rutile plants are IREL, Ganjam district, Odisha (100,000 tpy); KMML, Chavara, Kerala (50,000 tpy); DCW Ltd, Sahupuram, Tamil Nadu (42,000 tpy) and Cochin Minerals & Rutile Ltd, Kerala (45,000 tpy). Producers of titanium dioxide pigment are: KMML, Chavara, Kerala (40,000 tpy) and Travancore Titanium Products Ltd, Thiruvananthapuram, Kerala (22,000 tpy). Besides, Kilburn Chemicals and Kolmak Chemical Ltd have an estimated installed capacity of 12,000 tpy and 3,000 tpy titanium dioxide pigment, respectively. The production of synthetic rutile in 2009-10 was about 71 thousand tonnes as against 62 thousand tonnes in 2008-09. Production of titanium dioxide pigment was estimated at 54.1 and 63.6 thousand tonnes, respectively, during 2008-09 and 2009-10. IREL has not reported synthetic rutile production in recent years. KMML has reported production of 35,486 tonnes and 35,908 tonnes of pigment grade TiO₂ in 2008-09 and 2009-10, respectively. CMRL (34,200 tonnes), DCW Ltd (36,384 tonnes) and TTPL (15,273 tonnes) were the other producers of titanium dioxide pigment during 2009-10. IREL has now initiated process to set up a 10,000 tpy titanium sponge plant at OSCOM, Odisha.

Sulphuric Acid

There were 104 units with an annual capacity of more than 6 million tonnes per annum, manufacturing sulphuric acid in the organised sector based on sulphur as a raw material. In addition, it is also recovered during copper smelting by HCL, Hindalco and Sterlite and during lead-zinc smelting by HZL and BZL. The total production of sulphuric acid in 2008-09 and 2009-10 was 6.40 million tonnes and 7.44 million tonnes, respectively.

Phosphoric Acid

Important units producing phosphoric acid of various grades such as pharma grade, food grade,

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technical grade, analytical reagent grade etc. were Coromandel Fertilizers Co. Ltd, Visakhapatnam, Andhra Pradesh; Gujarat State Fertilizer Company, Vadodara, Gujarat; Fertilizers and Chemicals Travancore Ltd (FACT), Udyogmandal, Kochi, Kerala; Albright Morarji and Pandit Ltd, Ambarnath, Maharashtra; Rashtriya Chemicals & Fertilizers Ltd (RCF), Trombay, Maharashtra; Fertilizer Corp. of India (FCI), Sindri, Jharkhand; HCL, Khetri, Rajasthan; HZL, Udaipur, Rajasthan; Southern Petrochemical Industries Corp. Ltd, Tuticorin, Tamil Nadu; EID Parry (India) Ltd, Ennore, Tamil Nadu; Star Chemical Ltd, Haldia, West Bengal; Ballarpur Industries Ltd, Karwar, Karnataka; Hindalco Industries Ltd, Dahej, Gujarat; and Paradeep Phosphates Ltd, Paradeep, Odisha. Some of the important uses are in the manufacture of phosphatic fertilizers, agricultural feed, waxes, polishes, soaps and detergents.

Ferro-phosphorus

It is used as an ingredient in high strength low-alloy steel, foundry products & as a brake liners with 23% min. phosphorus, 1% max. carbon. Ferro-phosphorus is also used as a manufacturing drying agent.

Red Phosphorus

Star Chemicals (Bombay) Pvt. Ltd and United Phosphorus Ltd, Gujarat are the leading manufacturers and suppliers of the red phosphorus in the country mainly consumed in the match industry for making strike plate of match box. Besides, it has applications in agriculture industry as fumigant and also as flame retardant. It is also used in pharmaceutical for synthesis of a drug. The production level was at 50,000 tonnes in the recent years.

Borax

Borax was manufactured by Borax Morarji Ltd, Ambarnath, Maharashtra. The plant has an installed capacity of 17,000 tpy borax and 6,000 tpy boric acid. The plant is based on imported crude sodium borate concentrates (rasorite) and crude calcium borate (colemanite) which are not available indigenously and hence

imported. National Peroxide Ltd, Kalyan, Maharashtra, has 1,200 tpy combined installed capacity to produce other boron compounds; namely, sodium perborate - tetrahydrate and monohydrate. As a thumb rule for one tonne production of boric acid, about 2 tonnes of boro-gypsum is produced. However, boro-gypsum requires market for its disposal.

Besides the above listed chemicals, activated bleaching earth, fluorochemicals, alumina ferric and sodium silicofluoride were the other mineral-based products.

CHEMICAL FERTILIZERS

There are 56 large size fertilizer units in the country manufacturing a wide range of nitrogenous, phosphatic and complex fertilizers. The Government of India has been consistently pursuing policies conducive to increase the availability and consumption of fertilizers in the country and, as a result, India became the third largest fertilizer producer in the world. The overall consumption of fertilizers in terms of nutrients (viz, N, P & K) is about 168 lakh tonnes per annum.

Indigenous raw materials are available mainly for nitrogenous fertilizers in the country. Prior to 1980, nitrogenous fertilizer plants were based mainly on naphtha as feedstock. During 1978 to 1982, a number of fuel oil/LSHS-based ammonia-urea plants were also set up. A number of gas-based ammonia-urea plants were set up in 1985. The natural gas was obtained from Bombay High and South Basin. Recently, a number of expansion projects have come up with dual feed facility using both naphtha and gas.

In case of phosphatic fertilizers, indigenous rock phosphate supplies meet only 5 to 10% of the total requirement of P_2O_5 . The domestic requirement is therefore, supplemented by imported rock phosphate and sulphur, as also by imported intermediate products; viz, ammonia and phosphoric acid and to some extent by finished fertilizers.

In the absence of commercially exploitable resources of potash in the country, the entire demand of potassic fertilizers is met through imports. The fertilizer plant operators in

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the country have fully absorbed and assimilated the latest technological developments incorporating environment-friendly process technology and are in a position to operate and maintain the plants at their optimum levels on international standards in terms of capacity utilisation, specific energy consumption and pollution standards. The fertilizer industry is carrying out de-bottlenecking and energy saving schemes in the existing plants to enhance capacity and to reduce specific energy consumption. Companies are also planning to convert existing naphtha-based fertilizer plants to liquified natural gas (LNG)/natural gas (NG)-based ones.

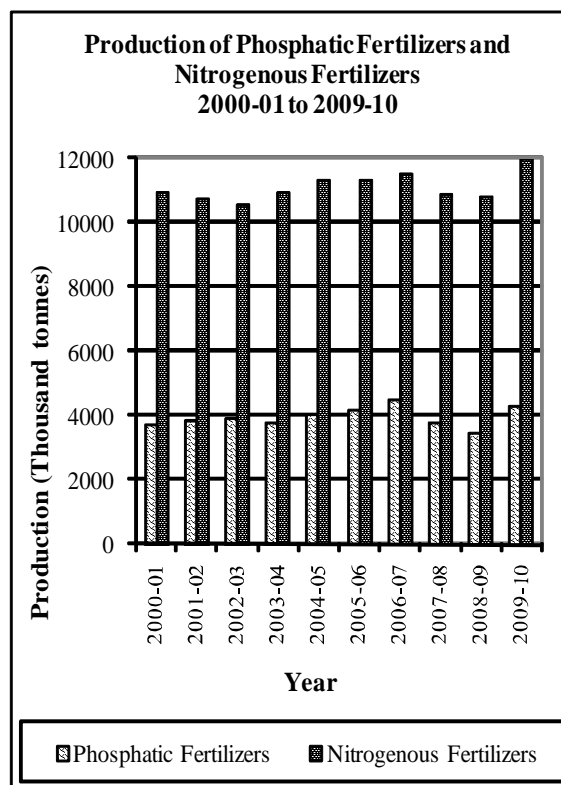
Out of the 56 large plants, 30 units produced urea, 21 units produced diammonium phosphate (DAP) and complex fertilizers, 9 units produced ammonium sulphate (AS) as by-product. Besides, 5 units produce calcium ammonium nitrate (CAN) and other low analysis straight nitrogenous fertilizers. Besides, there were 72 small and medium-scale units in operation, producing single superphosphate (SSP).

Table – 15 : Capacity and Production of Nitrogenous and Phosphatic Fertilizers (By Sectors)

Sector/Nutrient	Capacity as on 31.3.2009	Production ('000 tonnes)	
		2008-09	2009-10
Nitrogen (N)	12061	10870	11968
Public sector	3498	2925	3039
Co-operative sector	3169	3133	3386
Private sector	5394	4812	5493
Phosphates (P)	5659	3464	4352
Public sector	433	192	224
Co-operative sector	1713	916	1173
Private sector	3513	2357	2956

Figures rounded off individually.

Source: Ministry of Chemicals and Fertilizers, Annual Report, 2009-10.



Paper & Paper Board Industry

The Indian paper industry is among the top 15 global players with a projected demand of 13 million tonnes by 2020. There are about 666 units manufacturing pulp, paper, paper board and news print. The total installed capacity is nearly 89 lakh tonnes. Production of paper & paper board during 2009-10 was about 49.54 lakh tonnes compared to 44.67 lakh tonnes during 2008-09. Production of bleached newsprint was 11.04 lakh tonnes and 9.52 lakh tonnes, respectively, during 2008-09 and 2009-10. The Indian paper industry is in a fragmental structure, consisting of small, medium and large paper mills, having capacities ranging from 5 to 800 tonnes per day. Although paper industry is based on 30% by wood based industry, 32% by agri-residue based and the remaining by recycled fibre based industry. Use of agro-residues for preparation of pulp also throws up challenges like pollution control, recycling, use of cost-effective technology for utilisation of agro residues etc. As a thumb rule, in paper industry, cost of energy is nearly 25% of cost of production and hence energy management is an important aspect in

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paper industry. Minerals like china clay, limestone, talc, salt, sulphur etc. besides coal as fuel are used as filler, coating and surface sizing etc., in this industry and also play vital role in quality control.

PAINT & ALLIED PRODUCTS INDUSTRY

The paint & allied products industry comprises paints, enamels, varnishes, pigments,

printing inks, etc. Approximately 60% of the production is contributed by the organised sector. During the year 2009-10, the production of paints, enamels and varnishes was estimated to be 7.55 lakh tonnes as compared to 5.42 lakh tonnes in 2008-09. India is self-sufficient in the production of paints. Barytes, bentonite, calcite, china clay, mica powder, rutile, talc/steatite, ochre, silica & dolomite powder are some of the important minerals consumed in paint industry.

Table – 16 : Principal Fertilizer Plants

Sl. No.	Plant	Location
Public Sector		
1.	National Fertilizer Ltd	Nangal-II and Bhatinda (Punjab), Panipat (Haryana), Vijaipur, Vijaipur Expansion (Madhya Pradesh)
2.	Brahmaputra Valley Fertilizer Corp. Ltd	Namrup- II and III (Assam)
3.	Fertilizers & Chemicals Travancore Limited	Udyogmandal and Cochin-II (Kerala)
4.	Rashtriya Chemicals & Fertilizers Limited	Trombay and Trombay IV, V and Thal (Maharashtra)
5.	Madras Fertilizers Ltd	Chennai (Tamil Nadu)
6.	Steel Authority of India Ltd	Rourkela (Odisha)
7.	Hindustan Copper Ltd	Khetrinagar (Rajasthan)
Private Sector Large Units		
8.	Gujarat State Fertilizers Co. Ltd	Vadodara and Sikka I & II (Gujarat)
9.	Shriram Fertilizers & Chemicals	Kota (Rajasthan)
10.	DIL (Duncan Industries Ltd)	Kanpur (Uttar Pradesh)
11.	Zuari Agro Chemicals Ltd	Zuari Nagar (Goa)
12.	Coromandal Fertilizers Ltd	Visakhapatnam and Kakinada (Andhra Pradesh), Ennore (Tamil Nadu)
13.	Mangalore Chemicals & Fertilizers Limited	Mangalore (Karnataka)
14.	Gujarat Narmada Valley Fertilizers Company Limited	Bharuch (Gujarat)
15.	Southern Petrochemicals Industrial Corp.	Tuticorin (Tamil Nadu)
16.	Tata Chemicals Ltd	Haldia (West Bengal), Babrala (Uttar Pradesh)
17.	Punjab National Fertilizers and Chemicals Ltd	Nangal (Punjab)
18.	Deepak Fertilizers & Petrochemicals Corporation	Taloja (Maharashtra)
19.	Tuticorin Alkali	Tuticorin (Tamil Nadu)
20.	Indo-Gulf Fertilizers & Chemicals Corp. Ltd	Jagdishpur (Uttar Pradesh)
21.	Nagarjuna Fertilizers & Chemicals Limited	Kakinada I & II (Andhra Pradesh)
22.	Godavari Fertilizers & Chemicals Ltd	Kakinada (Andhra Pradesh)
23.	Hin. Ind. Ltd	Dahej (Gujarat)
24.	Chambal Fertilizers & Chemicals Ltd	Gadepan I & II (Rajasthan)
25.	KSF Ltd	Shahjahanpur (Uttar Pradesh)
26.	Paradeep Phosphates Ltd	Paradeep (Odisha)
Co-operative Sector		
27.	Indian Farmers' Fertilizers Co-operative Ltd	Kalol and Kandla (Gujarat), Aonla I & II, Phulpur I & II (Uttar Pradesh), Paradeep (Odisha)
28.	Krishak Bharti Co-operative Ltd	Hazira (Gujarat)

PETROLEUM REFINERIES

There were 20 refineries operating in the country (17 in public sector, including one in joint sector and three in private sector). Out of the 16 public sector refineries, 7 were owned by Indian Oil Corporation Ltd (IOCL), two by Chennai Petroleum Corporation Ltd (CPCL), a subsidiary of IOCL; two each by Hindustan Petroleum Corporation Ltd (HPCL); and Bharat Petroleum Corporation Ltd (BPCL) and one by Oil & Natural Gas Corporation Ltd, one each by Bongaigaon Refinery & Petrochemicals Ltd (BRPL), a subsidiary of IOCL; Numaligarh Refineries Ltd (NRL), a subsidiary of BPCL and ONGC. With the merger of RPL with RIL w.e.f. 1st April 2008, RIL is among the top 10 private sector refining companies globally owning about 25% of world's most complex refining capacity.

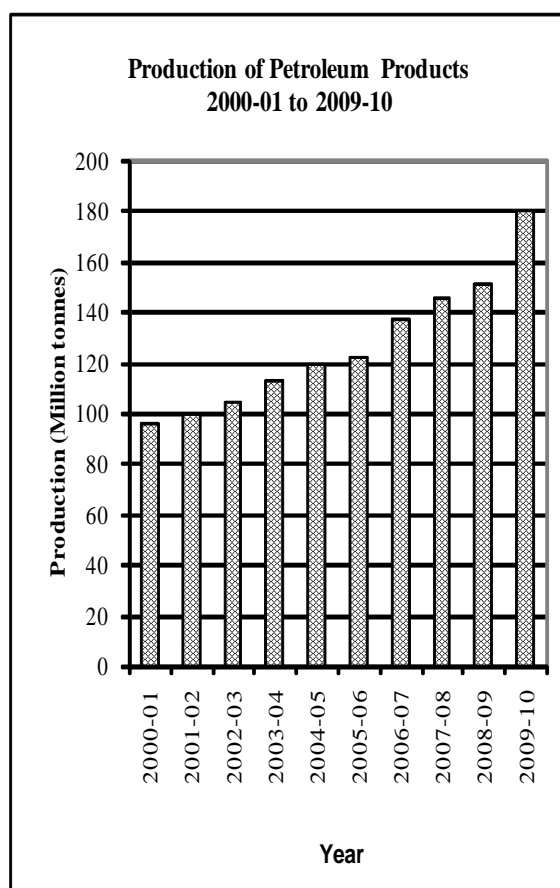
There is one refinery in the joint venture; viz, Mangalore Refinery & Petrochemicals Ltd (MRPL). Installed capacity and crude throughputs of refineries are given in Table-17.

The total refining capacity in the country as on 1.4.2010 is around 182 million tpy. The total crude throughput increased to 192.77 million tonnes in 2009-10 from 160.72 million tonnes in 2008-09. Production of petroleum products also increased to 179.77 million tonnes in 2009-10 from 150.52 million tonnes in 2008-09. The total exports of petroleum products during 2008-09 and 2009-10 were 38.57 million tonnes and 50.97 million tonnes, respectively. Import of petroleum products during the same period was 20.33 million tonnes and 14.66 million tonnes, respectively. During 2009-10, crude oil production in the country was at 33.69 million tonnes while the natural gas production was at 47.51 billion cubic metres in 2009-10. Imports of petroleum (crude) and natural gas during 2009-10 were 153.63 million tonnes and 9.11 million tonnes, respectively.

India has a near self-sufficiency in the refinery sector. In the next five years, the following additional refining capacities totalling

about 112 million tpy are reportedly expected to come on stream: (i) 1.5 million - IOCL, Haldia, (ii) 3.0 million - IOCL, Panipat, (iii) 15.0 million - IOCL,Paradeep, (iv) 2.4 million - HPCL, Mumbai, (v) 7.5 million - HPCL, Vizag, (vi) 9.0 million - Mittal, Bhatinda, (vii) 6.0 million - BPCL, Bina, (viii) 2.0 million - BPCL, Kochi, (ix) 1.7 million - CPCL, Chennai, (x) 5.31 million - MRPL, Mangalore, (xi) 0.08 million - ONGC, Tatipaka, (xii) 23.5 million - Essar, Vadinar and (xiii) 6.0 million - Nagarjuna, Cuddalore. There are also reports of the LN Mittal Group signing an MoU with HPCL. Total (of France), GAIL and OIL for jointly developing a 15 million tpy refinery cum petrochemicals complex in Visakhapatnam at a cost of \$ 6 billion.

The number of persons employed in 2010 in petroleum industry was around 129,988.



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Table – 17 : Installed Capacity and Crude Throughputs in Refineries

(In '000 tonnes)

Refinery	Annual installed capacity (as on 1.4.2010)	Refinery Crude throughput		
		2007-08	2008-09	2009-10
Total	182386	156103	160772	192768
Public/Joint Sector	111886	112541	112223	112117
IOCL, Guwahati, Assam	1000	920	1076	1078
IOCL, Barauni, Bihar	6000	5634	5940	6184
IOCL, Koyali, Gujarat	13700	13714	13852	13206
IOCL, Haldia, West Bengal	7500	5715	6042	5686
IOCL, Mathura, Uttar Pradesh	8000	8033	8601	8107
IOCL, Dibgoi, Assam	650	564	623	600
IOCL, Panipat, Haryana	12000	12821	13070	13615
BPCL, Mumbai, Maharashtra	12000	12746	12262	12516
BPCL (formerly KRL), Kochi, Kerala	9500	8134	7739	7875
HPCL, Mumbai, Maharashtra	5500	7409	6652	6965
HPCL, Vizag, Andhra Pradesh	8300	9409	9155	8796
CPCL, Manali, Tamil Nadu	9500	9802	9718	9580
CPCL, Narimanam, Tamil Nadu	1000	464	418	517
BRPL, Bongaigaon, Assam	2350	2020	2163	2220
MRPL, Mangalore, Karnataka	11820	12525	12577	12498
NRL, Numaligarh, Assam	3000	2568	2251	2619
ONGC, Tatipaka, Andhra Pradesh	66	63	84	55
Private Sector	70500	43562	48549	80651
RPL, Jamnagar, Gujarat	33000	36931	35636	34415
RPL* (SEZ), Jamnagar, Gujarat	27000	–	–	32735
Essar Oil Ltd., Vadinar, Gujarat	10500	6631	12913*	13501

Source: Basic Statistics on Indian Petroleum and Natural Gas, 2010-11, Ministry of Petroleum & Natural Gas, Government of India.

Note: CPCL and BRPL are subsidiaries of IOC, NRL of BPCL and MRPL of ONGC.

* RPL(SEZ), Jamnagar, Gujarat was commissioned on 25.12.2008 and started production from January, 2009.

FOUNDRY

There are more than 5,000 foundry units in India, having an installed capacity of approximately 7.5 million tonnes per annum. However, the majority of the foundry unit falls under the category of small-scale industry. Domestic production of steel castings during 2008-09 and 2009-10 is estimated at 3.48 lakh and 2.88 lakh tonnes, respectively. Production of cast iron (CI) castings is estimated at 2.87 lakh and 3.09 lakh tonnes, respectively, during the same period.

Typically, each foundry cluster is known to cater to specific end-use markets. The Coimbatore cluster is famous for pump-sets castings; Kolhapur and Belgaum cluster for automotive castings and

Rajkot cluster for diesel engine castings; Butalu-Jalandhar cluster mainly for machine parts and agricultural implements. The Indian foundry Association (IFA) was to start foundry park in Howrah district (WB) on Ranihatani-Amta Road over an area of about 926 acres. Foundry Informatics Centre, New Delhi, caters to the need of its members to generate useful analytical and commercial information on foundry and allied industry.

Although, intermediate mineral-based products like pig iron, scrap of metals and ferro-alloys, etc. are main inputs for foundry, minerals like bentonite, coke, coal, fireclay, fluorite, iron ore, limestone, silica sand, zircon flour, etc. are being consumed in the foundry industry.