

36 Ferro-alloys

Ferro-alloys are one of the important inputs in the manufacture of alloys and special steel. Ferro-alloys impart special properties to steel. The function of the alloy is to increase resistance to corrosion, oxidation to improve hardness, tensile strength at high temperatures, wear and abrasion resistance with addition of carbon to increase creep strength, etc. The growth of Ferro-alloys Industry is, thus, linked with the development of the Iron and Steel Industry, Foundry Industry and to some extent Electrode Industry. The principal ferro-alloys are of chromium, manganese and silicon. The product series consists mainly of ferro-manganese, silico-manganese, ferro-silicon and ferro-chrome.

Ferro-alloys are classified into two main categories viz, bulk ferro-alloys and noble ferro-alloys. Due to high cost of power, Ferro-alloys Industry has not been functioning to its full capacity. Ferro-alloys Industry spends 40 to 70% production cost on power consumption. The power consumption per tonne of ferro-alloys production in the country varied from 3,000 to 12,000 kWh.

About 35 to 40% production of ferro-alloys is exported. Ferro-manganese, silico-manganese, ferro-silicon, high carbon ferro-chrome and charge-chrome are exported after meeting the domestic requirements. India has sufficient raw materials of good quality, highly-skilled technical manpower and the latest equipment technology for production of ferro-alloys.

INDUSTRY, PRODUCTION, DEVELOPMENT AND CONSUMPTION

As per Indian Ferro-alloys Producers' Association (IFAPA), the total installed capacity of bulk Ferro-alloys Industry in India is 3.60 million tonnes per annum and for noble ferro-alloys it is 40 thousand tonnes per annum. The Industry is reported to be working at about 60-65% capacity utilisation. The details are given in Table-1.

Table – 1 : Capacity of Ferro-alloys Industry in India

(In tonnes per annum)	
Ferro-alloy	Installed capacity
Total	3640000
Bulk Ferro-alloys:	3600000
Manganese alloys	2100000
Chrome alloys	1300000
Ferro-silicon	200000
Noble Ferro-alloys:	40000(e)

Source: IFAPA.

The Ferro-alloys Industry is spread all over the country. It was established as an ancillary industry to cater to the growing needs of the domestic Steel Industry. Most of the ferro-alloy units have been set up in Andhra Pradesh, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha and West Bengal because of availability of the raw material. Recently, the Industry has further spread to the North-Eastern Region of India. In Meghalaya, a number of small units producing ferro-silicon and ferro-silico-manganese have come up. The production of various ferro-alloys, as reported by IFAPA is given in Table-2.

The overall production in 2009-10 has increased substantially by 13.3% to 2.51 million tonnes from 2.22 million tonnes in 2008-09. The ferro-alloys units have incorporated the latest technology in order to use non-metallurgical grade ores, both lumps and fines, after necessary beneficiation and agglomeration. The units have also incorporated the effective pollution control measures in the form of gas cleaning, deoxidising and waste heat recovery.

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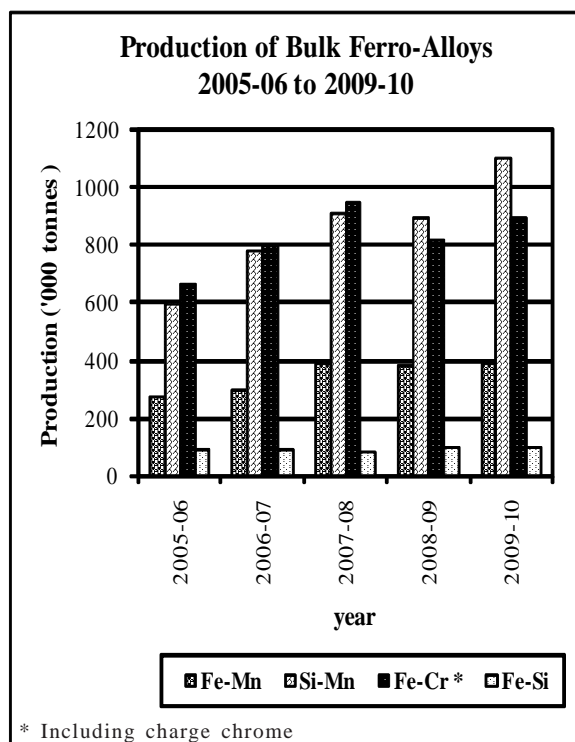
Table – 2 : Production of Ferro-alloys, 2007-08 to 2009-10

(In tonnes)

Ferro-alloy	2007-08	2008-09	2009-10
Total (A) + (B)	2364614	2220304	2,514,628
A) Bulk Ferro-alloys	2334929	2192869	2,483,320
HC Ferro-manganese	377958	370531	374,225
MC Ferro-manganese	7517	8291	9,222
LC Ferro-manganese	5735	5755	6,018
Silico-manganese	858601	845432	1,045,226
MC Silico-manganese	35041	31521	39,233
LC Silico-manganese	17760	14505	15,379
Ferro-silicon	83716	99595	101,917
HC Ferro-chrome/charge-chrome	948366	814868	889,093
LC Ferro-chrome	235	2371	3,007
B) Noble Ferro-alloys	29685	27435	31,308
Ferro-molybdenum	2899	2162	2,822
Ferro-vanadium	1585	1501	1,389
Ferro-tungsten	51	150	150
Ferro-silico-magnesium	13525	13400	17,132
Ferro-aluminium	9377	8170	7,017
Ferro-silicon-zirconium	109	87	120
Ferro-titanium	1937	1661	2,379
Ferro-boron	80	83	90
Ferro-nickel-magnesium	122	221	209

Note: HC: High carbon MC: Medium carbon LC: Low carbon

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



BULK FERRO-ALLOYS

Bulk ferro-alloys consist of principal alloys, viz, ferro-manganese, silico-manganese, ferro-chrome, charge-chrome and ferro-silicon.

Ferro-manganese/Silico-manganese

The ferro manganese is produced as high carbon ferro-manganese with 72-82% Mn, 6-8% C and 1.5% Si, medium carbon ferro manganese with 74-82% Mn, 1-3% C and 1.5% Si, and low carbon ferro-manganese with 80-85% Mn, 0.1-0.7% C and 1-2% Si. Manganese in the form of ferro-manganese is added for hardening and desulphurisation of steel. Nav Bharat Ferro Alloys Ltd, Paloncha, Andhra Pradesh; Chhattisgarh Electricity Co. Ltd, Raipur, Chhattisgarh; Indsil Energy & Electro Chemicals Ltd, Raipur, Chhattisgarh; Ispat Godavari, Raigarh, Chhattisgarh; Monet Ispat Ltd, Raipur, Chhattisgarh; Union Ferro, Raigarh, Chhattisgarh; Prakash Industries, Raigarh, Chhattisgarh;

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Tirumala Balaji Alloys Pvt. Ltd, Raigarh, Chhattisgarh; Vandana Global Ltd, Raipur, Chhattisgarh; SAL Steels Ltd, Gandhidham, Gujarat; Anjaneya Ferro Alloys Ltd, Mihijam, Jharkhand; Gautam Ferro Alloys Ltd, Ramgarh, Jharkhand; Shivam Iron & Steel Co. Pvt. Ltd, Giridih, Jharkhand; Sandur Manganese & Iron Ores Ltd, Sandur, Karnataka; Indsil Electromelt Ltd, Palakkad, Kerala; Maharashtra Electromelt Ltd, Chandrapur, Maharashtra; Nagpur Power Ind. Ltd, Kanhan, Maharashtra; Natural Sugar & Allied Ind. Ltd, Osmanabad, Maharashtra; Adhunik Meghalaya Steels Pvt. Ltd, Bymihat, Meghalaya; Meghalaya Sova Ispat Ltd, Meghalaya; Shayam Century Ltd, Meghalaya; Tata Steel Ltd, Joda, Orissa; Bhaskar Shrachi Alloys Ltd, Durgapur, West Bengal; Cosmic Ferro Alloys Pvt. Ltd, Bankura, West Bengal; Dayal Ferro Alloys Ltd, Ramgarh, West Bengal; Haldia Steels Ltd, Burdwan, West Bengal; Impex Ferro Tech Ltd, Burdwan, West Bengal; Maithan Alloys Ltd, Burdwan, West Bengal; Modern India Con-Cast Ltd, Birhampur, West Bengal; Sharp Ferro Alloys Ltd, Durgapur, West Bengal; Shri Gayatri Minerals Ltd, Bihnapur, West Bengal; Shayam Ferro alloys Ltd, Burdwan, West Bengal; and Sova Ispat Ltd, Durgapur, West Bengal, are the major producers of ferro-manganese/silico-manganese.

Silico-manganese, a combination of 60-70% manganese, 10-20% silicon and 20% carbon is used as substitute to low carbon ferro-manganese in the Steel Industry. It consumes around 4,750 to 5,250 kWh power per tonne of silico-manganese produced. Silico-manganese has emerged as a more important alloy than ferro-manganese. The country, thus, has emerged as a leading producer of silico-manganese. Silico-manganese was also produced by a number of small-scale ferro-alloy producers.

The total production of ferro-manganese in 2008-09 was about 384,600 tonnes which increased to about 389,500 tonnes in 2009-10. Consumption of ferro-manganese was 130,000 tonnes in 2009-10.

The production of silico-manganese including medium carbon & low carbon silico-manganese which was about 891,500 tonnes in 2008-09 increased to 1,099,800 tonnes in 2009-10. The total consumption of silico-manganese by all industries has been on a rise. The reported

consumption in 2009-10 at 201,600 tonnes is attributed mainly to the rise in production of iron and steel.

Ferro-chrome/Charge-chrome

Ferro-chrome when added to steel imparts hardness, strength and augments its stainless characteristics. Carbon content classifies the ferro-chrome alloy into high carbon (6-8%), medium carbon (3-4%) and low carbon (1.5-3%) although chromium content in all the three grades is around 60-70 percent. Around 2.5 tonnes chrome ore with an estimated power consumption of 4,500 kWh is required to produce one tonne of ferro-chrome.

Ferro Alloys Corp. Ltd, Garividi, Andhra Pradesh; GMR Technologies & Ind. Ltd, Srikakulam, Andhra Pradesh; Jindal Steel & Power Ltd, Raigarh, Chhattisgarh; Standard Chrome Ltd, Raigarh, Chhattisgarh; SAL Steel, Kachchh-Bhuj, Gujarat; Balasore Alloys Ltd, Balasore, Odisha; IDCOL Ferro Chrome Plant, Jajpur Road, Odisha; Indian Metals & Ferro Alloys Ltd, Theruballi, Odisha; Jindal Stainless Ltd, Dubari, Odisha; Nava Bharat Ferro Alloys Ltd, Dhenkanal, Odisha; Utkal Manufacturing Services Ltd, Choudhwar, Odisha; Rawat Ferro Alloys, Cuttack, Odisha; Rohit Ferro Tech. P. Ltd, Bishnupur, West Bengal and Sri Vasavi Ind. Ltd, Bishnupur, West Bengal are the major ferro-chrome producers. A sizeable quantity is also produced by units in the small-scale sector.

Tata Steel Ltd, FACOR and Indian Charge Chrome Ltd, the three major producers of charge-chrome in the country are 100% export-oriented, having a total capacity of 167,750 tpy. Tata Steel with its charge-chrome plant at Bamnival, Odisha, has a capacity of 55,250 tpy. FACOR has a capacity of 50,000 tpy charge-chrome at its Randia Plant, Bhadrak district, Odisha. Indian Charge Chrome Ltd, Cuttack district, Odisha has an installed capacity of 62,500 tpy.

The production of high carbon ferro-chrome/charge-chrome which was 814,900 tonnes in 2008-09 increased to 889,100 tonnes in 2009-10. The production of low carbon ferro-chrome which was about 2,400 tonnes in 2008-09 increased to 3,000 tonnes in 2009-10. The consumption of ferro-chrome in 2009-10 was reported to be 273,600 tonnes.

Ferro-silicon

Ferro-silicon contains about 75-90% silicon and minor amounts of iron, carbon, etc. It is produced by using quartzite, iron ore, coke and electrode paste. Around 1.75 to 2 tonnes quartzite is required to produce one tonne of ferro-silicon. A very high consumption of power, i.e., 9,000 to 10,000 kWh is required to produce one tonne ferro-silicon. It is a powerful deoxidising agent and its major applications are in electrical steel used for transformers and dynamos, alloy steel for tools & automobile valves, in iron casting and mineral dressing.

Bharat Alloys & Energy Ltd, Kurnool, Andhra Pradesh; VBC Ferro Alloys, Medak, Andhra Pradesh; SMS Smelters Ltd, Lekhi, Arunachal Pradesh; Visvesvaraya Iron & Steel Plant, Bhadravati, Karnataka; Silical Metallurgic Pvt. Ltd, Palakkad, Kerala; Jayantia Alloys, Meghalaya and Indian Metals & Ferro Alloys Ltd, Therubali, Odisha are the major producers of ferro-silicon. Small-scale producers of ferro-silicon are also in operation in Kerala and Tamil Nadu. In Meghalaya, three units have sprung up that produce ferro-silicon.

The production of ferro-silicon which was 99,600 tonnes in 2008-09 increased to 101,900 tonnes in 2009-10. The domestic consumption of ferro-silicon in the organised sector was 44,600 tonnes in 2009-10.

NOBLE FERRO-ALLOYS

Noble ferro-alloys are one of the vital additive inputs required especially in production of alloy and special steel. Noble ferro-alloys also refer to alloys used in small quantities and are relatively expensive compared to bulk ferro-alloys. These are used in the production of steel as deoxidant and alloying agents.

These high temperature alloys impart strength, resistance and stability within a temperature range from 260 to 1200 °C. These alloys are used generally in turbine engines, power plants, furnaces and all pollution control equipment. Noble ferro-alloys include ferro-vanadium, ferro-titanium, ferro-nickel, ferro-molybdenum, ferro-tungsten and ferro-niobium. In India, noble ferro-alloys are mostly manufactured through alumino-thermic process.

Ferro-nickel

Production of ferro-nickel was not reported in the organised sector. However, production of around 200 tonnes each year of ferro-nickel-magnesium was reported in 2008-09 and 2009-10.

The reported consumption of ferro-nickel in 2009-10 was 2,124 tonnes.

Ferro-molybdenum

There were five important units, namely, Mehra Ferro-alloys, Electro Ferro-alloys Pvt. Ltd, India Thermit Corporation, Dandeli Steel & Ferro-alloys Ltd and Eastern Metals & Ferro-alloys Ltd. The all India production which was 2,162 tonnes in 2008-09 increased to 2,822 tonnes in 2009-10. The consumption reported in 2009-10 was 1,085 tonnes.

Ferro-tungsten

Production of ferro-tungsten has remained static at 150 tonnes in 2008-09 & 2009-10. The reported internal consumption was 18 tonnes for the year 2009-10.

Ferro-vanadium

Production of ferro-vanadium in 2008-09 which was 1,501 tonnes decreased to 1,389 tonnes in 2009-10. The reported consumption in 2009-10 was 770 tonnes.

Others

Misra Dhatu Nigam Ltd (A Govt. of India Enterprise), Hyderabad, produced chiefly cobalt, molybdenum, titanium and tungsten-based super-alloys.

The production details of various types of bulk ferro-alloys and noble ferro-alloys in 2008-09 and 2009-10 are furnished in Table - 2.

Information on plantwise capacity of principal ferro-alloys in India together with general specifications of products is given in Table-3. Consumption of principal alloys by different industries are detailed in Table-4.

World production of various ferro-alloys in principal producing countries is furnished in Table-5.

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Table – 3 : Statewise, Plantwise Capacity and Specifications of Principal Ferro-alloys Produced in India

(In tonnes)			
Name & location of the plant	Product	Specifications	Installed capacity
Andhra Pradesh			
Andhra Ferro-alloys Ltd Srinivasanagar, Dist. Vizianagaram	HC ferro-chrome	Cr: 60-65% Si: 2-4% C: 6-8% P: 0.040% S: 0.040%	20,000
Ferro Alloys Corporation Ltd Shreeramnagar, Dist. Vizianagaram	Ferro-manganese ferro-chrome	NA Cr: 60-63% Si: 3-4%, C : 6-8% P: 0.03-0.05% (max) S: 0.03-0.05% (max)	72500 (For all ferro-alloys)
	Silico-manganese	–	
	Ferro-silicon	NA	
	Silico-chrome	NA	
	Other ferro-alloys	NA	
Jindal Stainless Ltd (Ferro Alloys Division) Jindal Nagar, Kothavalasa Dist.Vizianagaram .	HC ferro-chrome	Cr : 62%, Si : 2.5% C : 7-8%, P: 0.040%	40000
GMR Technologies & Industries Ltd Village Ravivalasa Dist. Srikakulam.	LC ferro-manganese MC ferro-manganese HC ferro-manganese	Mn : 60% Si : 16% S: 0.05%, P: 0.5%	25000 (Total)
	Silico-manganese	–	–
	Ferro-silicon	–	–
	LC ferro-chrome	Cr: 60-68%	–
	HC ferro-chrome	Si: 2.0 to 4%	–
	Silico-chrome	P: 0.03%, S: 0.05%	–
VBC Ferro Alloys Ltd Village Rudraram Dist. Medak.	Ferro-silicon HC ferro-chrome	– –	19000 18000
Nav Bharat Ferro-Alloys Ltd E.M.D., Paloncha, Kothagudem Dist. Khammam.	HC ferro-chrome	Cr: 60% (min), Si : 3-4% (max) C: 6-8%, P : 0.03% (max) S: 0.03% (max)	12491
	Silico-manganese	Mn : 60-70% Si: 15-16% (min) C: 2% (max), P: 0.03% (max) Si: 0.03% (max)	9581
	Ferro-silicon	Si: 40-45%/70-75%/75-80% Al: 0.5% (max)/1.25% (max) C: 0.15% (max), P: 0.05% (max) S: 0.05% (max)	9309
Sree Sarda Alloys Ltd Ravivalsa, Tekkali Mandal Dist. Srikakulam.	Ferro-chrome	NA	6000
Chhattisgarh			
Hira Group of Industries Jain Carbides & Chemical Ltd (i) Unit 1, Urla, Dist. Raipur.	HC ferro-manganese	Mn : 70-75%, Si: 1.5% (max) C: 6-8% (max), P: 0.40% (max) S: 0.05% (max)	7000
	Silico-manganese	Mn: 60-65%, Si : 13-17% (max) C: 2.5% (max), P : 0.35% (max) S: 0.03% (max)	20000

(Contd.)

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Table - 3 (Contd.)

Name & location of the plant	Product	Specifications	Installed capacity
(ii) Unit-2	HC ferro-manganese		14000
	Silico-manganese	Mn: 60-65%	12000
(iii) Hira Ferro Alloys Ltd Urla, Dist. Raipur.	Ferro-manganese	NA	10000
	Silico-manganese	NA	7000
(iv) Alok Ferro-Alloys Ltd Raipur.	Silico-manganese	NA	18000
INDSIL Energy & Electrochemical Ltd Raipur, Chhattisgarh	HC ferro-manganese	N A	25000
	Silico-manganese	Mn: 55% (min) Si: 23-27% C: 0.1 % (max)/0.2% (max)/0.3% (max) S: 0.02% (max) P:0.15% (max)	21500
Sarda Energy & Minerals Ltd (Formerly Raipaur Alloys & Steel Ltd.)	Ferro-manganese	-	-
	Silico-manganese	-	-
Chhattisgarh Electricity Co. Ltd Siltara, Raipur.	HC ferro-manganese	Mn: 70-75% Si: 1.5-2.0% C: 6.0-8.0% P: 0.35-0.40% S: 0.05 (max)	36000
	Silico-manganese	Mn: 60-65% Si: 15-20% C: 2.0-2.5 P: 0.3-0.35% S: 0.05 (max)	NA
Nav-chrome Ltd Urla Industrial Area Dist. Raipur.	HC ferro-manganese	NA	21560
	Silico-manganese	NA	
	HC ferro-chrome	NA	14700
Deepak Ferro Alloys Ltd Urla Industrial Area Raipur.	HC ferro-chrome	Cr : 60-70% Si : 2 to 4%, S : 0.05% C : 6 to 8%	5000
Jindal Steel & Power Ltd Raigadh.	HC Ferro-chrome	Cr: 60-66% C : 6 to 8% Si: 4% (max) P: 0.050 (max) S: 0.050 (max)	36000
Goa Karthik Alloys Ltd	NA	NA	4100
Gujarat Essel Mining & Industries Ltd Vapi, Dist. Valsad.	Ferro-vanadium	V: 50%, C: 0.1% (max) S and P: 0.05% each Al: 1.5%	400
	Ferro-molybdenum	Mo: 60%, C: 0.1% S: 0.08%, P: 0.06% Al: 0.5%	1200
	Ferro-titanium	NA	600
Electro Ferro-Alloys (Pvt.) Ltd Ahmedabad, Gujarat.	Ferro-molybdenum Ferro-silico-zirconium	NA	300
Baroda Ferro-Alloys Dist. Panchmahals.	HC ferro-chrome	NA	3500

(Contd.)

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Table - 3 (Contd.)

Name & location of the plant	Product	Specifications	Installed capacity
Haryana			
Haryana Ferro-Alloys Ltd	-	-	2500
Jharkhand			
Anjaney Ferro Alloys Ltd, Mihijam Dist. Dumka.	Ferro-silicon Silico-manganese Ferro-manganese	NA NA NA	NA NA NA
Gautam Ferro-Alloys Ltd	-	-	5500
Karnataka			
Sandur Manganese & Iron Ore Ltd Vyasanakere, Dist. Bellary (Plant closed since 1.8.1998)	HC ferro-manganese Silico-manganese Ferro-silicon		29100 20000 24000
Dandeli Steel & Ferro Alloys Ltd Dandeli, Dist. Uttara Kannada.	Ferro-manganese	Mn : 70-75%, C: 0.1% Si : 2.4%, P : 0.15% S : 0.05%, Size: 37 mm	6000
	MC ferro-manganese	Mn: 70-75%, C: 1.5%, P: 0.25% Si: 2%, S: 0.05%	
S.R. Chemicals & Ferro-alloys KIADB Honaga, Belgaum	LC Ferro-manganese	Mn: 70% C: 0.1% P: 0.12%	25
Thermit Alloys (Pvt.) Ltd KSSIDC Industrial Estate Shimoga.	Ferro-manganese Silico-manganese Ferro-chrome Ferro-silicon Silico-chrome	NA NA NA NA NA	1200
Kerala			
The Silical Metallurgic Ltd Wayalur, Dist. Palakkad.	Silico-manganese	Mn: 70-75%	3600
INDSIL Electrosmelts Ltd Pallatheri, Dist. Palakkad.	Silico-manganese Ferro-silicon	NA NA	NA NA
INDSIL Hydro Power & Manganese Ltd Palakkad, Kerala	Silico-manganese	Mn: 55% (min) Si : 23-27% C: 0.1 % (max)/0.2% (max)/0.5% (max) S: 0.02% (max) P: 0.15% (max)	14400
Shri Laxmi Electro Smelters (Pvt.) Ltd. Industrial Development Area Erumathala, P.O. Aluva - 683 105.	Ferro-silicon	NA	NA
Madhya Pradesh			
Manganese Ore (India) Ltd Ferro-manganese Plant Bharweli (Manjhara), Dist. Balaghat.	HC ferro-manganese	Mn: 78±1% P: 0.35% (max) C: 6.8%	10000
Jalan Ispat Castings Ltd Industrial Area Meghnagar, Dist. Jhabua.	Silico-manganese	Mn: 60-65%, Si: 15-20% C: 2% (max), P: 0.35%	12000
Crescent Alloys Pvt. Ltd Seoni.	Ferro-silicon Ferro-manganese	N.A. N.A.	4500 (Total)
Maharashtra			
Maharashtra Electrosmelt Ltd Mul Road, Chandrapur - 442 401.	HC ferro-manganese MC ferro-manganese	Mn : 70-74% Si : 1.5% (max) C : 6.8%, P: 0.43%. (max) NA	100000 (Total)

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Table - 3 (Contd.)

Name & location of the plant	Product	Specifications	Installed capacity
Nagpur Power & Industries Ltd P.O. Khandelwalnagar Dist. Nagpur.	Silico-manganese	NA	
	Silico-manganese	Mn : 60-65%, P: 0.35%	NA
	HC ferro-manganese	Mn : 70-75%, P: 0.4%	NA
Bharat Pulverising Mills Ltd Andheri, Mumbai.	Ferro-molybdenum	NA	200
	Ferro-tungsten	NA	(Total)
	Ferro-vanadium	NA	
Sunbel Alloys Co. of India Ltd Thane-Belapur, Mumbai.	Ferro-molybdenum	NA	300
	Ferro-silicon	NA	(Total)
	Ferro-tungsten	NA	
	Ferro-vanadium	NA	
Natural Sugar and Allied Ind. Ltd, Sainagar, Ranjani, Dist.: Osmanabad.	HC Ferro-manganese	MN: 70-75% Si: 2-2.5% P: 0.4% C: 6-8%	(5 MVA)
	Silico-manganese	MN: 60-65% Si: 13-15% P: 0.3% C: 2-2.5%	(6 MVA)
Odisha Ferro Alloys Corporation Ltd (Charge-chrome Division) Randia, Dist. Bhadrak.	HC ferro-chrome/ Charge-chrome	Cr: 60-64%, Si: 3-4% S: 0.03-0.05% (max) P: 0.03-0.05% (max) C: 6-8%	50000 NA
Tata Steel Ltd Ferro-manganese Plant, Joda, Dist. Keonjhar	HC ferro-manganese	MN: 68-73%	NA
	Silico-manganese	Mn: 46-48% Si: 14.56%, P: 0.197%	NA
Tata Steel Ltd., Charge-chrome Plant Bamnipal, Dist. Keonjhar.	Charge-chrome	Cr: 60 (min), Si: 4% (max) C: 8% (max), P: 0.03% (max) S: 0.03% (max)	55250
Balasore Alloys Ltd, Balgopalpur, Dist. Balasore. (Formerly Ispat Alloys Ltd)	HC ferro-chrome	Cr: 60-63% Si: 3.5% (max) C: 8.0% (max)	Grade I 100000
		Cr: 57-60% S: 4.0% (max) C: 8.0% (max)	
Jeypore Sugar Co. Ltd, (Ferro-manganese Plant) Dist. Rayagada.	HC ferro-chrome	Cr: 60-65% P: 0.055% C: 2% S: 0.05% Si: 4% Fe: Balance	22000
	Silico-manganese	Mn: 60-65% Si: 15-18% C: 2% max.	22000
IDCOL Ferro Chrome & Alloys Ltd Jajpur Road, Dist. Jajpur.	HC ferro-chrome	Cr: 62-65% Si: 1.5 to 8% C: 8% (max)	18000
Indian Charge Chrome Ltd Choudwar, Dist. Cuttack.	HC ferro-chrome/ Charge-chrome	Cr : 60%	62500 (Contd.)

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Table - 3 (Contd.)

Name & location of the plant	Product	Specifications	Installed capacity
Indian Metals & Ferro Alloys Ltd (IMFA), Therubali, Dist. Rayagada.	Ferro-silicon HC ferro-chrome	Si: 70-75% Cr: 60%	61000 235000
Superb-Metalalloys (Pvt.) Ltd Rairangpur, Dist. Sundergarh	Ferro-columbium Ferro-molybdenum Ferro-tungsten Ferro-vanadium	NA	300 (Total)
Puducherry			
The Silical Metallurgic Ltd	Ferro-silicon Ferro-silicon-magnesium	- -	10560 1800
VSK Ferro Alloys Ltd Thuthipet.	Ferro-silicon	Si : 72.3%, C: 0.15% S : 0.051%, Mn : 0.55% P : 0.042%, Fe : 26.127%	3000
Snam Alloys (Pvt.) Ltd Kariamanikam, Dist. Puducherry.	Ferro-silicon Ferro-silicon-magnesium	NA	12000
Punjab			
Mehra Ferro-Alloys Verka, Amritsar.	Ferro-molybdenum Ferro-vanadium Ferro-titanium Ferro-tungsten Ferro-boron	NA	300 (Total)
Sikkim			
Akshay Ispat & Ferro Alloys Ltd, Mamring, Namchi, Dist. South Sikkim.	Ferro-silicon	NA	6000
Uttar Pradesh			
The India Thermit Corpn. Ltd Fazalganj, Kanpur.	Ferro-molybdenum Ferro-titanium Ferro-chrome Ferro-boron Chromium metal LC ferro-manganese Ferro-vanadium	NA	300 (Total)
Hindustan Ferro-Alloys Hamirpur.	Ferro-silicon	NA	3200
West Bengal			
Bhaskar Shrachi Alloys Ltd, Durgapur	Silico-manganese	Si: 15%	24000
Cosmic Ferro Tech. Ltd, Bishnupur, Dist: Bankura.	HC ferro-manganese Silico-manganese	Mn: 66-71%, Si: 1.4% C: 6.5-7%, P: 0.3% Mn: 61-65%, Si: 15.5% C: 1.9%, P: 0.28%	45375
Sri Gayatri Minerals Pvt. Ltd, WBHDC Growth Centre, Bishnupur, Bankura.	Silico-manganese	Mn: 60% (min) Si: 14-16% C: 2-2.5%	24000
Karthik Alloys Ltd (I & II) Durgapur.	Silico-manganese	NA	7300
Maithan Alloys Ltd, Burdwan.	Ferro-manganese Silico-manganese	NA	52600 (Total)

(Contd.)

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Table - 3 (Concl'd.)

Name & location of the plant	Product	Specifications	Installed capacity
Monnet Ferro Alloys Ltd Burdwan.	Ferro-chrome Silico-manganese	NA	12500
Shyam Ferro Alloys Ltd Burdwan.	HC silico-manganese HC ferro-manganese HC ferro-chrome	NA	100000 (Total)
Srinivasa Ferro Alloys Ltd Durgapur, Burdwan.	HC ferro-manganese Silico-manganese	NA NA	48200 36000
Shri Vasavi Industries Ltd WBIIDC Industrial Growth Centre, Bishnupur, Dist. Bankura.	HC ferro-chrome	Cr: 62-50% Si: 3-5%	45000
Modern India Con-Cast Ltd, WBIIDC Industrial Growth Centre, Bishnupur, Dist. Bankura.	Bulk ferro-alloys	–	22000
Rohit Ferro Tech. Ltd Bishnupur, Dist. Bankura	HC ferro-chrome	Cr: 60% (min.), C: 8% (max) Si: 3.5% (max), P: 0.03% (max) S: 0.04% (max)	45375

Note: HC : High carbon. MC: Medium carbon. LC: Low carbon.

Source: Information collected by IBM on non-statutory basis.

**Table – 4 : Reported Consumption of Principal Ferro-alloys, 2009-10 (P)
(By Industries)**

Ferro-alloy							(In tonnes)
	Iron & steel	Alloy steel	Sponge iron	Foundry	Electrode	Ferro-alloys	Total
Ferro-aluminium	8 (1)	52(1)	–	–	–	–	60
Ferro-chrome	234,000(11)	37700(15)	1300(1)	600(21)	++(3)	–	273,600
Ferro-chrome-silicon		460(1)					460
Ferro-manganese	120,200(13)	8200(14)	++(1)	1100(30)	500(14)	–	130,000
Ferro-molybdenum	282(8)	727(9)	–	76(13)	–	–	1085
Ferro-nickel	–	2124(4)	–	–	–	–	2124
Ferro-niobium	621(3)	7(2)	–	2(1)	–	–	630
Ferro-phosphorus	151(2)	44(3)	–	17(2)	–	–	212
Ferro-silicon	36,900(13)	4700(12)	800(5)	2100(27)	++(6)	100(1)	44600
Ferro-silicon-magnesium				14(3)			14
Ferro-titanium	746(8)	216(6)	–	6(3)	–	–	968
Ferro-tungsten	–	18(2)	–	–	–	–	18
Ferro-vanadium	642(10)	121(8)		7(4)			770
Silico-manganese	196,322(13)	3103(6)	2058(7)	156(4)			201639

Note: Figures rounded off. Figures in parentheses denote the number of units in the organised sector reporting consumption. Data collected on non-statutory basis.

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**Table – 5 : World Production of Ferro-alloys, 2007 to 2009
(By Principal Countries)**

(In tonnes)

Country	Ferro-alloy	2007	2008	2009
Australia	FeMn	133816	128000	130000 ^e
	FeSiMn	105800	126000	120000 ^e
	Silicon metal ^e	30000	30000	30000
Brazil	FeCr	177656	209273	108893
	FeSiCr	12943	13674	1750
	FeSiMg	30221	30800	18300
	FeMn	135757	149900	44600
	FeSiMn	225373	238000	109500
	FeNi	28900	26300	31600
	FeNb	71676	81600	48900
	FeSi	196403	183000	175000
	Others	45330	47800	21200
Canada	FeNb ^e	6500	6700	6600
	FeSi ^e	70000	70000	70000
China	FeCr	1296000	1505800	1813000
	FeSiCr	38700	72300	116000
	Others	16165000	16722000	20171000
Colombia	FeNi	114600	97000	118000
Dominican Republic	FeNi	75069	47408	-
Finland	FeCr	241760	233550	123310
France	FeMn & Spiegeleisen	98066	100000 ^e	100000 ^e
	FeSiMn ^e	65000	55000	55000
	FeSi ^e	71000	22000	20000
	Silicon metal ^e	120000	100000	100000
Georgia	FeSiMn	107989	123468	120000 ^e
Greece	FeNi ^e	93300	83200	41300
Iceland	FeSi	114886	107882	135834
India	FeAl	9377	8170	7017
	FeCr	948601	817239	892100
	FeSiMg	13525	13400	17132
	FeMn	391210	384577	389465
	FeSiMn	911402	891458	1099838
	FeMo	2899	2162	2822
	FeSi	83716	99595	101917
	FeTi	1937	1661	2379
	FeV	1585	1501	1389
	Others	362	541	569

(Contd.)

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Table - 5 (Concl.d.)

Country	Ferro-alloy	2007	2008	2009
Japan	FeCr	12016	13888	7698
	FeMn	420151	431181	361375
	FeSiMn	52901	58884	49205
	FeMo	4573	4554	3598
	FeNi	351503	301361	284884
	FeV	3205	3477	2560
	Others	13982	14478	12957
Kazakhstan	FeCr	1307536	1220315	977235
	FeSiCr	145685	133828	51576
	FeSiMn	188445	179939	181776
	FeSi	59886	54964	30028
	Others	1222	1473	-
New Caledonia	FeNi	170870	148960	156553
Norway	FeMn ^e	130000	130000	130000
	FeSiMn	293699	273485	250000 ^e
	FeSi	170024	185344	233974
	Others ^e	62000	60000	60000
Russia	FeCr	564474	475686	235600
	FeSiCr	97915	72050	8285
	FeMn ^e	120000	110000	110000
	FeSiMn ^e	40000	40000	40000
	FeNi ^e	26031	39503	40000
	FeSi	896100	850000 ^e	850000 ^e
	Others ^e	34000	34000	34000
South Africa	FeCr	3551983	3268659	2341754
	FeMn ^e	672000	498000	257000
	FeSiMn ^e	355000	263000	136000
	FeSi	140000	137000	110000
	FeV ^e	19000	17000	17000
Sweden	FeCr	124400	118700	50000 ^e
Ukrain	FeMn	368321	361501	135339
	FeSiMn	1281073	958667	771950
	FeNi	95619	97848	76487
	FeSi	218485	201706	193034
	Others	53174	43127	23882
USA	FeSi	271000	287000	245000
Venezuela	FeMn ^e	15000	15000	15000
	FeSiMn ^e	35000	35000	35000
	FeNi ^e	57000	57000	57000
	FeSi ^e	92000	92000	92000
Zimbabwe	FeCr	187327	145430	72223

Source: World Mineral Production, 2005-2009

Note: FeAl : Ferro-aluminium; FeCr : Ferro-chrome; FeSiCr : Ferro-silico-chrome; FeSiMg : Ferro-Silico-magnesium; FeMn : Ferro-manganese; FeSiMn : Ferro-silico-manganese; FeMo : Ferro-molybdenum; FeNi : Ferro-nickel; FeNb : Ferro-niobium; FeSi : Ferro-silicon; FeTi : Ferro-titanium; FeV : Ferro-vanadium.

ENVIRONMENTAL ASPECTS AND FUTURE SCOPE

Studies reveal that depending on the ferro-alloy manufactured, waste generation per day in 35 tpd and 50 tpd ferro-silicon and ferro-chrome plants, respectively, may be in the following range:

Silica fines: 7 to 8 tonnes/day

Fe-Cr slag (fined boulder): 40 tonnes/day

Charcoal & coke fines: 7 to 8 tonnes/day

To utilise the waste from ferro-alloys industries, a typical Fe-Si or Fe-Cr manufacturing unit can provide material for 10 small-scale units for manufacturing bricks and each unit can produce 2,400 bricks per day. Other units which can be set up are board-and-briquette-making units. The utilisation of waste materials by converting them into building materials will result in bringing down the building material cost and therefore lead to conservation of natural resources like clay and sand.

Domestic vanadium sludge is used for producing ferro-vanadium by Essel Mining & Industries Ltd, Gujarat.

The implementation of the Kyoto Protocol by European Union provides significant opportunities for Ferro-alloys Industry in India to implement CO₂ reduction technologies which could be traded in terms of carbon credits. Installation of an electricity generation facility driven by CO-rich furnace gas is an obvious means by which CO₂ saving could be achieved.

WORLD REVIEW

The top ferro-alloy producing countries were China, South Africa, India, Kazakhstan and Russia. Estimated world production of bulk ferro-alloys of chromium, manganese and silicon was about 29.4 million tonnes in 2009 as compared to that of 31.5 million tonnes produced in 2008. The world production of ferro-alloys for the years 2007 to 2009 are given in Table-5. The markets for the bulk alloys like high carbon ferro-manganese, silico-manganese, ferro-silicon and high carbon ferro-chrome showed varied responses to the fluctuations in steel and stainless steel production which seem to have had influences as per the different circumstances that prevailed in different markets.

FOREIGN TRADE

Exports

In 2009-10, exports of ferro-alloys decreased to 8,62,769 tonnes valued at Rs. 4139 crore from 9,60,100 tonnes valued at Rs. 6878 crore in the previous year. In terms of quantity, exports of ferro-chrome accounted for 55% followed by ferro-silico-manganese (35%) and ferro-manganese (8%) in 2009-10. The other ferro-alloys together accounted for remaining 2% of exports. Exports were mainly to China (34%), Rep. of Korea (14%), Japan (13%), Italy (8%) and Netherlands (5%) (Tables 6 to 24).

Imports

Imports of ferro-alloys increased from 1,40,415 tonnes valued at Rs.1,815 crore in 2008-09 to 2,08,973 tonnes valued at Rs.1,863 crore in 2009-10. In terms of quantity, imports of ferro-silicon accounted for about 60% followed by ferro-manganese (14%), ferro-nickel (10%) and ferro-chrome (8%). Other ferro-alloys together accounted for remaining 8% of imports in 2009-10. Imports were mainly from Bhutan (33%), followed by Russia (14%), China (13%) and South Africa (10%) (Tables 25 to 42).

**Table – 6 : Exports of Ferro Alloys : Total
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	960100	68781535	862769	41394476
China	227338	11155714	292379	13105035
Japan	103467	9005428	114013	5937996
Korea, Rep. of	74380	5974523	122533	5881230
Italy	98986	7201058	65039	3000745
Netherlands	148642	11922341	44114	2139267
Chinese Taipei/ Taiwan	16842	1452765	36422	1845369
Thailand	15317	1213446	19582	923747
Pakistan	17102	1139235	17323	772548
Spain	27394	1823556	5572	264755
USA	31689	2671670	2111	165197
Other countries	198943	15221799	143681	7358587

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**Table – 7 : Exports of Ferro-Boron
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	2	380	3	629
Iran	–	–	3	602
Turkey	–	–	++	17
Sri Lanka	–	–	++	10
Netherlands	2	380	–	–

**Table – 8 : Exports of Ferro-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	491677	34188265	471953	21848549
China	222368	10887037	290386	12998441
Korea, Rep. of	54453	4553875	94289	4397977
Japan	79213	7187367	49201	2575797
Korea, Dem. Rep. of	4000	400808	7073	347970
Netherlands	50273	4020279	4773	173952
Thailand	3908	445779	2397	121400
USA	20390	1673013	1589	112487
Belgium	9833	549231	2319	111777
Italy	11572	1023114	2387	99336
Slovenia	9511	913493	761	40544
Other countries	26156	2534269	16778	868868

**Table – 9 : Exports of Charge-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	1001	53644	++	3
Tanzania	–	–	++	2
South Africa	–	–	++	1
Afghanistan	++	11	–	–
Nepal	2	70	–	–
Netherlands	999	53563	–	–

**Table – 10 : Exports of Ferro-Manganese
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	121533	11214086	66521	3388350
Chinese Taipei/ Taiwan	5388	563836	10252	579196
Egypt	3978	306159	7346	407637
Netherlands	28919	2936469	6636	317351
Pakistan	8102	691380	6910	308375
Italy	9490	892818	5482	292246
Iran	9382	1059396	2236	110703
Saudi Arabia	8058	668528	1946	91244
UK	2384	261364	898	46836
UAE	6804	701573	746	30602
USA	10865	958021	270	28080
Other countries	28163	2174542	23799	1176080

**Table – 11: Exports of Ferro-Molybdenum
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	888	53679	1766	237214
Netherlands	–	–	1120	141693
UAE	472	33284	458	60791
Portugal	–	–	20	16983
Singapore	–	–	8	7506
Pakistan	10	993	94	3494
Saudi Arabia	7	1406	10	2537
Jordan	24	718	20	2310
Malaysia	1	1219	22	585
Philippines	250	9664	2	76
Ghana	41	4268	–	–
Other countries	83	2127	12	1239

**Table – 12 : Exports of Ferro-Nickel
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	8	3873	++	9
Nepal	–	–	++	9
Bangladesh	4	3669	–	–
Kenya	4	204	–	–

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**Table – 13 : Exports of Ferro-Niobium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	192	41614	118	23717
UAE	21	3345	70	7314
Singapore	–	–	6	5966
Malaysia	–	2	3043	–
Israel	11	3048	11	2024
Brazil	–	–	10	1587
UK	–	–	2	1303
Japan	–	–	1	1210
Netherlands	–	–	1	720
Turkey	110	32748	++	40
Bangladesh	50	2465	–	–
Other countries	++	8	15	510

**Table – 14 : Exports of Ferro-Phosphorous
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	169	5637	11	740
UK	36	1491	10	667
China	–	–	++	57
Oman	–	–	1	15
Germany	++	15	–	–
Japan	72	2088	–	–
Korea, Rep. of	37	1205	–	–
Netherlands	24	838	–	–
Other countries	–	–	++	1

**Table – 15 : Exports of Ferro-Selenium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	++	19	–	–
Malaysia	++	19	–	–

**Table – 16 : Exports of Ferro Silico-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	26	2363	–	–
Djibouti	26	2363	–	–

**Table – 17 : Exports of Ferro-Silico-Magnesium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	3295	282169	3597	242902
Turkey	277	22644	850	58250
Brazil	430	37210	635	46042
Japan	–	–	432	27550
Malaysia	183	17873	150	10812
Portugal	216	18413	144	9945
Sri Lanka	180	11372	172	9506
Slovenia	445	38785	109	7891
Egypt	182	13795	77	5964
France	240	22963	56	4347
Spain	300	30073	–	–
Other countries	842	69041	972	62595

**Table – 18 : Exports of Ferro Silico-Manganese
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	300421	19983391	298301	14469837
Japan	22351	1641731	62603	3244507
Italy	68835	4612636	52665	2365612
Korea, Rep. of	18020	1255978	25882	1368295
Netherlands	55902	3931613	25826	1195650
Chinese Taipei/ Taiwan	8936	611796	20734	1018310
Thailand	10779	709501	15179	690044
Pakistan	8439	416048	9703	429638
Malaysia	2096	140546	8568	412995
Turkey	8938	576019	8614	391989
Spain	23001	1480744	4410	206301
Other countries	73124	4606779	64117	3146496

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**Table – 19 : Exports of Ferro-Silicon
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	37170	2804810	20106	1156561
Netherlands	12354	948679	5422	293541
Italy	8836	654103	4490	242461
Belgium	2755	202041	1591	87469
Brazil	558	46971	981	70390
France	1093	72931	757	48772
Spain	2251	156339	862	45218
Slovenia	503	35399	719	44179
UK	1100	84462	549	39879
Poland	899	67856	422	22854
Romania	1048	78050	185	10234
Other countries	5773	457979	4128	251564

**Table – 20 : Exports of Ferro-Titanium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	2	457	6	881
Israel	1	272	1	273
Chile	–	–	2	269
Saudi Arabia	–	–	1	109
Vietnam	–	–	1	99
Turkey	–	–	1	88
Kenya	–	–	++	32
USA	–	–	++	8
Philippines	–	–	++	3
Germany	1	173	–	–
UAE	++	12	–	–

**Table – 21 : Exports of Ferro-Tungsten
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	3	128	1	232
UAE	–	–	1	182
Philippines	–	–	++	46
Israel	3	128	++	4

**Table - 22 : Exports of Ferro-Vanadium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	388	52353	29	6729
USA	130	7550	5	2495
Iran	–	–	10	2088
Brazil	–	–	10	746
Indonesia	4	692	1	544
UAE	12	1721	3	528
Turkey	10	306	++	182
Netherlands	105	27731	–	–
Pakistan	67	8078	–	–
Philippines	10	2207	–	–
Tanzania	30	3737	–	–
Other countries	20	331	++	146

**Table – 23 : Exports of Ferro-Columbium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	–	–	1	82
USA	–	–	1	82

**Table – 24 : Exports of Ferro-Alloys (Others)
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	3301	92205	355	17779
Singapore	–	–	50	4225
Japan	398	15335	120	3521
Egypt	1	47	20	1714
UAE	5	474	9	965
Israel	3	1408	13	960
Sweden	48	1902	24	625
Netherlands	50	1648	10	603
China	1126	28629	++	3
Mauritius	1296	31988	++	3
Ethiopia	270	7272	–	–
Other countries	104	3502	109	5160

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**Table – 25 : Imports of Ferro-Alloys: Total
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	140415	18147906	208973	18630802
Bhutan	38384	2316630	68031	3411035
Russia	15506	2612813	29615	2577942
China	41468	4509728	26313	2257003
Macedonia	25	23215	6550	1260447
Brazil	3194	2170672	3073	1232297
South Africa	16071	643503	20215	1077741
Korea, Rep. of	1344	450602	8942	955900
Norway	6674	770083	6851	592687
France	3218	376492	3416	411743
Greece	2150	661431	1540	319569
Other countries	12381	3612737	34427	4534438

**Table – 26 : Imports of Ferro-Boron
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	198	26167	263	35288
China	197	25526	262	34228
Belgium	-	-	1	622
Germany	1	641	++	383
Singapore	-	-	++	55

**Table – 27 : Imports of Ferro-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	12377	2661484	17226	1827839
Russia	7252	1594773	9235	1016278
China	2852	592465	3551	391389
Kazakhstan	1449	290640	2200	196684
South Africa	389	79909	1149	93093
Brazil	27	14888	331	34433
Thailand	-	-	142	14548
USA	53	10515	66	11121
UK	22	5641	32	9756
Australia	130	24231	-	-
Switzerland	60	18601	-	-
Other countries	143	29821	520	60537

**Table – 28 : Imports of Charge-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	-	-	500	16354
South Africa	-	-	500	16354

**Table – 29 : Imports of Ferro-Manganese
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	22007	1765283	28604	1700420
South Africa	12202	396296	16228	741484
Korea, Rep. of	1226	176324	6568	518283
Norway	3970	488065	4919	389117
Bahrain	150	8769	558	28956
China	3632	608741	105	9730
USA	-	-	65	6020
Russia	216	17607	90	3567
Germany	29	3988	-	-
Mexico	509	57454	-	-
Turkey	45	6383	-	-
Other countries	28	1656	71	3263

**Table – 30 : Imports of Ferro-Molybdenum
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	840	1815864	1109	1320615
Russia	115	131387	357	405166
Chile	67	129876	127	157175
Netherlands	194	420318	110	137065
Belgium	61	70461	114	135378
Mexico	-	-	83	104254
USA	2	4322	51	57412
China	251	633700	31	42399
Korea, Rep. of	77	242532	26	30820
Iran	29	80931	6	9408
Korea, Dem. Rep. of	32	80836	-	-
Other countries	12	21501	204	241538

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**Table – 31 : Imports of Ferro-Nickel
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	7663	2848105	21019	3465442
Macedonia	25	23215	6532	1258611
Japan	54	48701	4399	601087
Korea, Rep. of	–	–	2148	347570
Greece	2150	661431	1540	319569
Columbia	846	276300	841	181053
New Caledonia	628	456201	691	142022
Yugoslavia F. Rep/ Serbia Mt- Negro	837	297575	533	56084
Russia	1921	408487	996	49592
Germany	279	220485	63	12623
Dominic Rep.	518	278493	–	–
Other countries	405	177217	3276	497231

**Table – 32 : Imports of Ferro-Niobium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	1779	1958029	769	1171887
Brazil	1749	1917118	639	997400
Singapore	26	34332	108	139824
UK	2	4009	17	25105
Austria	–	–	2	4282
Russia	–	–	2	2728
Korea, Rep. of	–	–	1	2548
Spain	2	2569	–	–
Other countries	++	1	–	–

**Table – 33 : Imports of Ferro-Phosphorous
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	1336	37898	1138	25771
China	454	13908	1110	22442
Sweden	46	2058	9	2131
UK	5	676	13	644
Japan	–	–	6	536
Hong Kong	–	–	++	11
Singapore	–	–	++	7
France	++	577	–	–
Iran	174	4221	–	–
UAE	657	16458	–	–

**Table – 34 : Imports of Ferro-Silico-Chrome
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	–	–	7	997
China	–	–	5	379
Japan	–	–	2	618

**Table – 35 : Imports of Ferro-Silico-
Manganese
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	239	25652	1377	61995
South Africa	–	–	400	17592
Indonesia	2	364	275	16470
Georgia	–	–	290	10473
Japan	–	–	126	4448
Bahrain	–	–	81	3889
China	60	5330	30	2197
Poland	25	2068	26	2178
Malaysia	61	3284	25	577
Korea, Rep. of	30	6769	–	–
Russia	20	5137	–	–
Other countries	41	2700	124	4171

**Table – 36 : Imports of Ferro-Silico-Magnesium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	3834	316924	1523	109062
China	3123	264414	1027	75513
Brazil	258	19168	237	17990
Iceland	–	–	63	5505
Bahrain	–	–	88	3301
Russia	7	711	62	2756
Norway	391	25985	21	1966
South Africa	–	–	8	627
Germany	35	5425	–	–
UK	20	1221	–	–
Unspecified	–	–	10	1110
Other countries	–	–	7	294

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**Table – 37 : Imports of Ferro-Silicon
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	82751	5434244	125138	7025516
Bhutan	38384	2316630	68031	3411035
China	27769	1909073	15798	1062222
Russia	5685	365857	17404	896247
France	2944	325290	3224	393089
Iceland	–	–	4342	201268
Norway	2026	230075	1523	163019
Iran	50	2510	2223	124418
Ukraine	–	–	2389	108162
Brazil	551	53518	1115	102400
South Africa	3221	52564	1802	96300
Other countries	2121	178727	7287	467356

**Table – 40 : Imports of Ferro-Vanadium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	243	512008	881	948903
China	60	118271	188	222203
Austria	–	–	161	190992
South Africa	41	107470	109	110018
USA	–	–	151	105601
Russia	–	–	87	85191
UAE	–	–	40	43446
Korea, Rep. of	11	24977	50	42089
Japan	–	–	23	35850
Czech Republic	58	126027	16	30892
Brazil	51	89221	5	7116
Other countries	22	46042	51	75505

**Table – 38: Imports of Ferro-Titanium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	559	163324	1843	227645
UK	173	52831	794	108227
Russia	270	84274	240	37822
Brazil	–	–	395	26391
Korea , Rep. of	–	–	29	10027
Canada	–	–	70	9531
Spain	–	–	100	9262
China	57	9324	77	8069
Sweden	53	14620	20	3913
Germany	6	2275	27	2793
Unspecified	–	–	25	3803
Other countries	–	–	66	7807

**Table – 41 : Imports of Ferro-Zirconium
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	125	14229	193	22849
China	125	14229	172	18894
Brazil	–	–	21	3955

**Table – 39 : Imports of Ferro-Tungsten
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	45	61073	20	24976
China	44	59817	20	24976
Netherlands	1	1256	–	–

**Table – 42 : Imports of Ferro-Alloys (Others)
(By Countries)**

Country	2008-09		2009-10	
	Qty (t)	Value (Rs. '000)	Qty (t)	Value (Rs. '000)
All Countries	6419	507622	7363	645243
China	2844	254930	3926	341068
Argentina	685	77146	1292	112613
Russia	20	4580	1142	78595
Norway	221	19756	388	38585
Brazil	558	76759	320	35398
France	23	1977	145	17673
Austria	–	–	41	9144
UK	1418	42590	10	953
Germany	73	6604	1	820
South Africa	218	7264	++	105
Other countries	359	16016	98	10289

FUTURE OUTLOOK

Indian Ferro-alloys Industry is an important player in the international market. According to IFAPA, on an average, about 35 to 40% production is exported. Presently, the boom in World Steel Production drove demand mainly for the bulk alloys of manganese and silicon and alloys of micro-alloying elements, vanadium and niobium. The rise in stainless steel production resulted in increase in demand for alloys of chromium, nickel and molybdenum.

Indian Ferro-alloys Industry has a great future and it can compete with any country. India has advantage of having highly qualified and experienced technical personnel supported by skilled labour force. There is a need to encourage the Indian Ferro-alloys Industry for setting up captive power plants and also allot coal linkages for the same. The prospects for the Ferro-alloys Industry to grow are quite immense provided innovations are made in the process technology and plant equipment design, and new cost-effective product mix is frequented at.

