



Indian Minerals Yearbook 2020

(Part- II : Metals & Alloys)

59th Edition

FERROALLOYS

(ADVANCE RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 25 60648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

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6 Ferroalloys

Ferroalloys are one of the important inputs in the manufacture of alloys and special steel. They are used as deoxidisers and alloy additives in the steel manufacturing process. They impart special properties to steel. The alloys provide increased resistance to corrosion, improve hardness & tensile strength at high temperature, impart wear and abrasion resistance and increases creep strength etc. The growth of Ferroalloys Industry is, thus, linked with the development of the Iron and Steel Industry, Foundry Industry and to some extent Electrode Industry. The principal ferroalloys are chromium, manganese and silicon. The product series consists mainly of ferromanganese, silicomanganese, ferrosilicon and ferrochrome.

Ferroalloys are classified into two main categories, viz, bulk ferroalloys and noble ferroalloys. Bulk ferroalloys is majorly used in stainless steel & carbon steel. Most of the noble ferroalloys are made from rare-earth minerals and are expensive to produce as compared to bulk ferroalloys. Owing to high cost of power, Ferroalloys Industry has not been operating to its full capacity in India. Ferroalloys Industry spends 40 to 70% production cost on power consumption. The power consumption per tonne of ferroalloys production in the country varied from 3,000 to 12,000 kWh.

At present, major portion of the ferroalloys produced is exported. Ferromanganese, silicomanganese, ferrosilicon, high carbon ferrochrome and chargechrome are exported after meeting the domestic requirements.

INDUSTRY, PRODUCTION, DEVELOPMENT AND CONSUMPTION

As per Indian Ferroalloys Producers' Association (IFAPA), the total installed capacity of bulk Ferroalloys Industry in India is estimated at 5.10 million tonnes per annum and for noble ferroalloys it is 50,000 tonnes per annum. The products covered

are Manganese alloys (HC, MC & LC ferrochrome, silicochrome and charge chrome) and Noble ferroalloys (ferromolybdenum, ferrovanadium, ferrotungsten, ferrosilicon magnesium, ferroboration, ferrotitanium etc.). The details are furnished in Table- 1.

Table – 1 : Capacity of Ferroalloys Industry in India

(In tonnes per annum)	
Ferroalloys	Installed capacity
Total	5150000
Bulk Ferroalloys:	5100000
Manganese alloys	3160000
Chrome alloys	1690000
Ferrosilicon	250000
Noble Ferroalloys	50000

Source: Indian Ferroalloys Producers' Association (IFAPA), Mumbai.

The Ferroalloys Industry was established as an ancillary industry to cater to the growing needs of the domestic Steel Industry and is spread all over the country. Most of the ferroalloys 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 as well as uninterrupted electricity supply. Recently, the Industry has further spread to the North-Eastern Region of India. In Meghalaya, a number of small units producing ferrosilicon and ferrosilico-manganese have come up.

The ferroalloy 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 an effective pollution control measures in the form of gas cleaning, deoxidising and waste heat recovery.

BULK FERROALLOYS

Bulk ferroalloys consist of principal alloys, viz, ferromanganese, silicomanganese, ferrochrome, charge-chrome and ferrosilicon. The production of different kinds of ferroalloys was not received from IFAPA as well as from other sources. However, the data received from JPC for some of the ferroalloys and partial coverages on ferroalloys that have been published in IBM's Monthly Statistics of Mineral Production (MSMP) in its March, 2019 & 2020 issues have been reproduced in Table-2. It may be noted that the data coverage in Table-2 is partial and does not reflect the actual production of ferroalloys.

Ferromanganese/Silicomanganese

Ferromanganese is produced as high carbon ferromanganese with 72-82% Mn, 6-8% C and 1.5% Si; medium-carbon ferromanganese with 74-82% Mn, 1-3% C and 1.5% Si; and low-carbon ferromanganese with 80-85% Mn, 0.1-0.7% C and 1-2% Si. Silicomanganese on the other hand is a combination of 60-70% Mn, 10-20% silica and about 20% carbon. Manganese in the form of ferromanganese 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 Godawari Power & Ispat Ltd (GPIL), Chhattisgarh; Monet Ispat Ltd, Raipur, Chhattisgarh; Union Ferro, Raigarh, Chhattisgarh; Prakash Industries, Raigarh, Chhattisgarh; 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 Electros melt Ltd, Palakkad, Kerala; Chandrapur Ferro Alloys Plant (formerly Maharashtra Electros melt 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; Shyam Century Ltd, Meghalaya; Tata Steel Ltd, Joda, Odisha; 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, Bishnupur, West Bengal; Shyam Ferro Alloys Ltd, Burdwan, West Bengal; and Sova Ispat Ltd, Durgapur, West Bengal are the major producers of ferromanganese/silicomanganese.

Silicomanganese, is an alloy that contains 60-70% manganese, 16-28% silicon and 1.5 to 2.5% carbon. It is more preferred as an effective deoxidising agent than high-carbon ferromanganese in the production of various types of steels. It is also used as feedstock to produce refined alloys like medium and low-carbon ferromanganese. Around 4,750 to 5,250 kWh power is consumed to produce one tonne of silicomanganese. Silicomanganese has emerged as a more important alloy than ferromanganese. The country, over the year, has emerged as a leading producer of silicomanganese. Silicomanganese was also produced by a number of small-scale ferroalloy producers. The total production of ferromanganese in 2018-19 was about 5,18,000 tonnes. As per the annual return submitted to IBM in form 'O', the production of ferromanganese was 47,406 tonnes in 2019-20. The estimated consumption of ferromanganese was 50,800 tonnes in 2017-18. The production of silicomanganese (including medium-carbon & low-carbon silicomanganese) which was about 3,42,591 tonnes in 2018-19 decreased to 3,20,594 tonnes in 2019-20. In 2017-18, the total consumption of silicomanganese by all industries has been estimated at 1,22,600 tonnes.

Ferrochrome/Charge-chrome

Ferrochrome when added to steel imparts hardness, strength and augments its stainless characteristics. For every tonnes of stainless steel

(depending on the grade), there is 17-23% of chrome content is required. Hence, if the stainless-steel Industry grows, the Ferrochrome Industry also grows. Carbon content classifies the ferrochrome 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%. Around 2.5 tonnes chrome ore with an estimated power consumption of 4,500 kWh is required to produce one tonne of ferrochrome. Ferrochrome is produced by electric carbothermic reduction of chromite.

FACOR Alloys Ltd, Garividi, 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, Therubali, Odisha; Jindal Stainless Ltd, Duburi, Odisha; Nava Bharat Ferro Alloys Ltd, Dhenkanal, Odisha; Utkal Manufacturing Services Ltd, Choudhwar, Odisha; Rawat Ferro Alloys, Cuttack, Odisha; Rohit Ferro Tech. Pvt. Ltd, Bishnupur, West Bengal and Sri Vasavi Ind. Ltd, Bishnupur, West Bengal are the major ferrochrome producers. A sizeable quantity is also produced by units in the small-scale sector.

The total production of ferrochrome/charge chrome in 2018-19 was about 9,44,000 tonnes which decreased to 9,21,000 in 2019-20. The consumption of ferrochrome was estimated at 14,600 tonnes in 2017-18.

Ferrosilicon

Ferrosilicon 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 ferrosilicon. A very high consumption of power, i.e., 9,000 to 10,000 kWh is required to produce one tonne of ferrosilicon. 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 and in iron casting and mineral dressing. Ferrosilicon is used by the military to quickly produce hydrogen for balloons. For this, chemical reaction of sodium hydroxide, ferrosilicon and water is utilised.

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 ferrosilicon. Small-scale producers of ferrosilicon are also in operation in Kerala and Tamil Nadu. In Meghalaya, three units have sprung up that produce ferrosilicon.

The production of ferrosilicon in 2018-19 was about 90,000 tonnes while production during 2019-20 is not available. The domestic consumption of ferro-silicon in the Organised Sector was estimated at 23,400 tonnes in 2017-18.

NOBLE FERROALLOYS

Noble ferroalloys are one of the vital additive inputs required especially in production of alloy and special steel. Noble ferroalloys also refer to alloys used in small quantities and are relatively expensive compared to bulk ferroalloys. 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 1,200 °C. These alloys are used generally in turbine engines, power plants, furnaces and all pollution control equipment. Noble ferroalloys include ferrovanadium, ferrotitanium, ferronickel, ferromolybdenum, ferrotungsten and ferroniobium. In India, noble ferro alloys are mostly manufactured through alumino-thermic process.

Ferronickel

The consumption and production of ferronickel were not reported in the Organised Sector.

Ferromolybdenum

There were five important Units, namely, Mehra Ferroalloys, Electro Ferroalloys Pvt. Ltd, India Thermit Corporation, Bharat Pulverising Mills Ltd and Sunbel Alloys Co. of India Ltd. The all India production decreased considerably by 47% to 527 tonnes in 2019-20 as compared 1,003 tonnes in 2018-19.

Ferrotungsten

The consumption and production of ferrotungsten in 2019-20 were not reported in the Organised Sector.

Ferrovandium

Production of ferrovandium in 2018-19 was 1,013 tonnes which decreased considerably by 34% to 665 tonnes in 2019-20.

Others

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

The production details of various types of Bulk ferroalloys and Noble ferroalloys during the year 2017-18 to 2019-20 are furnished in Table- 2.

Information on plantwise capacity of principal ferroalloys in India together with general specifications of products is elucidated in Table-3. Consumption of principal alloys by different industries is furnished in Table- 4.

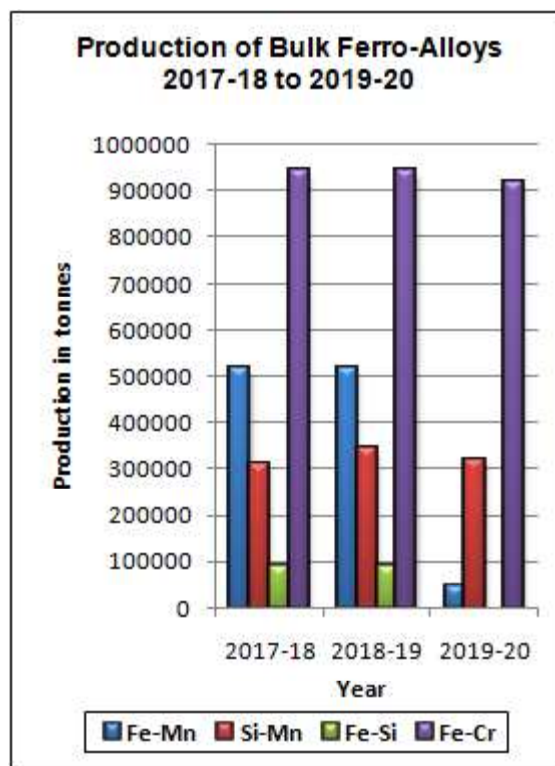


Table – 2 : Production of Ferroalloys, 2017-18 to 2019-20

(In tonnes)			
Ferroalloys	2017-18	2018-19	2019-20
A) Bulk Ferroalloys			
Ferromanganese	518000	518000	47406*
Silicomanganese	311326	342591	320594
Ferrosilicon	90000	90000	NA
Ferrochrome	944000	944000	921000
Charge-chrome	NA	NA	NA
B) Noble Ferroalloys			
Ferromolybdenum	1205	1003	527
Ferrovandium	1331	1013	665
Ferrotungsten	NA	NA	NA
Magnesium-ferro-silicon	15978	19180	13930
Ferroaluminium	4423	2752	1461
Ferro-silicon-zirconium	NA	NA	NA
Ferrotitanium	281	118	121
Ferroboration	NA	NA	NA
Ferriobium	NA	NA	NA

Source: Monthly Statistics of Mineral Production (MSMP), IBM, March, 2020 Issues.

*: Form 'O' Annual Return, 2019-20.

Table – 3 : Statewise, Plantwise Capacity and Specifications of Principal Ferroalloys Produced in India

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Andhra Pradesh			
Andhra Ferro-alloys Ltd, Srinivasanagar, Distt Vizianagaram	HC ferrochrome	Cr: 60-65% max. Si: 2-4% max. C: 6-8% max. P: 0.040% max. S: 0.040% max.	
	Silicomanganese	Mn: 60% min. C: 2.5% max. Si: 14% min. P: 0.3 % max. S: 0.035% max.	20,000
FACOR Alloys Ltd, Shreeramnagar, Garividi, Distt Vizianagaram	HC ferromanganese	Mn: 70-80%, C:6-8%, Si: 1-5 % max. P: 0.35% max. S: 0.05% max. Size: 25-150 mm +/- 10%, Corresponding ISI specification: IS 1171-2011.	72,500 (For all ferroalloys)
	HC Ferrochrome	Cr: 60-63%, Si: 3-4%, C: 6-8%, P: 0.03-0.05% (max.), S: 0.03-0.05% (max.)	90,345
	Silicomanganese	Mn: 60-70%, Si: 16-20%, C: 2.0% max. S: 0.03%, P: 0.3 %, Size: 10 - 150 mm +/- 10%, Corresponding ISI specification: IS 1470-1990.	
	Ferrosilicon	Si: 60-80%, C: 0.15% max. P: 0.05%, S: 0.05% max. Al : 1-15% max. Size: 25-150 mm +/- 10%, Corresponding ISI specification: IS 1110-2011.	
	Ferrosilicon-magnesium	Mg: 4-30%, Si: 44-55 %, Al: 1.00%, Ca: 1.0-4.0%,	
Deccan Ferro Alloys (P) Ltd, Chintalapalem (PO), Pendurthi (SO), Vizianagaram	Silico-chrome	NA	
	Silicomanganese	NA	30,000
Jindal Stainless Ltd, (Ferro Alloys Division) Jindal Nagar, Kothavalasa, Distt Vizianagaram.	HC ferrochrome	Cr: 62%, Si: 2.5%, C: 7-8%, P: 0.040%,	40,000
Sree Sarda Alloys Ltd, Ravivalsa, Tekkali Mandal, Distt Srikakulam.	Ferrochrome	NA	6,000
Metkore Alloys and Industries Ltd, Srikakulam.	H C ferrochrome	NA	25000
Siri Smetters & Energy Pvt. Ltd, Distt Vizianagaram.	Silicomanganese	NA	8,500

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FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Maithan Alloys Ltd, Visakhapatnam.	Ferroalloy	NA	1,20,000 (Total)
MDA Mineral Dhatu AP Pvt. Ltd, Distt Vizianagaram.	Ferro Mn Silico Mn	NA NA	9,000 11,000
Rhodium Ferro-alloys Pvt. Ltd, Gollapuram, Distt Anantapur	Ferrosilicon	NA	8,000
Ushodaya Electrodes Pvt. Ltd, Visakhapatnam	Ferromanganese	NA	4
Srinivasa Ferro Alloys Ltd, Visakhapatnam	Silicomanganese	NA	26000
Sri Raghvendra Ferro Alloys Pvt. Ltd,Nalgonda	Silicomanganese	NA	18000
Sri Balaji Electro Smelters Ltd, Hyderabad	Silicomanganese	NA	4650
Sri Mahalakshmi Smelters Pvt. Ltd, Vizianagaram	Ferrosilicon	NA	7,200
Nav Bharat Ventures Ltd, Distt Khammam	Silico Mn	NA	1,25,000
Anjaney Alloys Ltd, Atchutapuram, Distt Visakhapatnam	Ferroalloys	NA	120,000
M.B. SMELTERS Pvt. Ltd, Hindupur, Distt Anantapur	MC ferromanganese HC ferromanganese	NA NA	7,500 50,000
Chhattisgarh			
(i) Hira Ferro Alloys Ltd, Urla, Distt Raipur.	HC ferromanganese	Mn: 70-75%, Si: 1.50% max. C: 6-8 %, P: 0.30% max. S: 0.05% max.	61,500
	Silicomanganese	Mn: 60-65%, Si: 14-17%, C: 2.0% max. P: 0.35% max. S: 0.05% max.	
(ii) Alok Ferro-Alloys Ltd, Raipur.	Ferroalloys	NA	18,000
INDSIL Energy & Electrochemical Ltd, Raipur, Chhattisgarh	Silicomanganese	NA	19,200
Sarda Energy & Minerals Ltd	Ferromanganese	Mn: 70% (min.), Si: 1.5% (max.), C: 6-8%, P: 0.35% (max.), S: 0.050% (max.)	45 MVA (Total)
	Silicomanganese	Mn: 60% (min.), Si: 15-20%, C: 2.50% (max.), P: 0.35% (max.), S: 0.050% (max.)	
Chhattisgarh Electricity Co. Ltd, Siltara, Raipur.	HC ferromanganese	Mn: 70-75%, Si: 1.5-2.0%, C: 6.0-8.0%, P: 0.35-0.40%, S: 0.05% (max.)	36,000
	Silicomanganese	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, Distt Raipur.	HC ferromanganese Silicomanganese HC ferrochrome	NA NA NA	21,560 14,700

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FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Deepak Ferro Alloys Ltd	Ferromanganese		5,000
VA Power & Steel Pvt. Ltd, Distt Raigarh	Ferrosilicon Silicomanganese	NA NA	8,100 14,400
Orion Ferro alloys, Gharghoda, Raigarh	Silicomanganese Silico-slag (as by-product)	NA NA	8,000 12,000
Vandana Global Ltd, Raipur	Silicomanganese	NA	36,000
Jindal Steel & Power Ltd, Kharsia, Distt Raigarh.	HC Ferrochrome	Cr: 60-66%, C: 6 to 8%, Si: 4% (max.), P: 0.050% (max.), S: 0.050% (max.),	36,000
	Silicomanganese	Mn: 60%, Si: 15%, P: 0.3% max.	
Sai Chemical Pvt. Ltd, Tadesara, Distt Rajnandgaon	Silicomanganese	NA	10,200
MSP Sponge Iron Ltd, Manuapali, Jangaon, Raigarh (Chhattisgarh)	Silicomanganese	NA	42057
Goa			
Karthik Alloys Ltd, Cuncoim, Distt South Goa.	HC Silicomanganese	Mn:60-65% Si _{o₂} :14-15% (min.) C:2.5-0.20% (max.) P:0.03-0.2% (max.) S:0.05% (max.)	25,500
Gujarat			
Essel Mining & Industries Ltd, Vapi, Distt Valsad.	Ferrovandium	V: 50%, C: 0.1% (max.), S and P: 0.05% each, Al: 1.5%	400
	Ferromolybdenum	Mo: 60%, C: 0.1%, S: 0.08%, P: 0.06%, Al: 0.5%	1,200
	Ferrotitanium	NA	600
Electro Ferro-Alloys (Pvt.) Ltd, Ahmedabad, Gujarat.	Ferromolybdenum Ferrosilico-zirconium	NA	300
Baroda Ferro-Alloys, Distt Panchmahals.	HC ferrochrome	NA	3500
Sal Steel Ltd, Gandhidham, Distt Kachchh	Silicomangeneese	NA	61890
Sahjanand Ferro Alloys, Distt Vadodara.	NA	NA	3,000
Haryana			
Haryana Ferro-Alloys Ltd, Gohana Road, Distt Rohtak.	–	–	2,500
Jammu and Kashmir			
Shree Sitaram Industries Pvt. Ltd, Phase II, SIDCO Complex, Bari Brahmana.	Ferrochrome	NA	3,325
Jharkhand			
Anjaneya Ferro Alloys Ltd, Mihijam, Distt Jamtara	Ferroalloys	NA	41,850

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FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Bihar Foundry & Casting Ltd (Unit Gautam Ferro Alloys)	Silicomanganese	Si: 14%, Mn : 60%	34,000
Castron Technologies Ltd, Bokaro Industrial Area,	Ferromanganese Silicomanganese	NA NA	14,400
Shivam Iron & Steel Co. Ltd, Ferro Alloys Division, Jambad, Udnabad, Giridih	Ferromanganese Silicomanganese	NA	37,400
Dayal Ferro Alloys, Ramgarh Cantt., Hazaribagh	Silicomanganese	NA	10,000
Jamshedpur Mineral & Chemicals, Distt Saraikela-Kharaswan.	Ferromanganese	NA	4,800
Karnataka			
Sandur Manganese & Iron Ores Ltd, Vyasnakere, Distt Ballari	HC ferromanganese	NA	29,100
	Silicomanganese		36,000
	Ferrosilicon		24,000
Dandeli Steel & Ferro Alloys Ltd, Dandeli, Distt Uttara Kannada.	Ferromanganese	Mn: 70-75%, C: 0.1%, Si: 2.4%, P : 0.15%, S: 0.05%, Size: 37 mm	6,000
	MC ferromanganese	Mn: 70-75%, C: 1.5%, P: 0.25%, Si: 2%, S: 0.05%	
S.R. Chemicals & Ferro-Alloys, KIADB Honaga, Distt Belagavi.	LC Ferromanganese	Mn: 70%, C: 0.1%, P: 0.12%	25
Thermit Alloys (Pvt.) Ltd, N-7, Industrial Estate, Distt Shivamogga	Ferromanganese	NA	
	Silicomanganese	NA	
	Ferrochrome	NA	1,200
	Ferrosilicon	NA	
	Silicochrome	NA	
Padmavati Ferrous Ltd, Distt Ballari	Ferromanganese	Mn: 24 to 48%	5,000
	Silicomanganese	Fe:4 to 30%	5,000
	Ferrosilicon		2,000
Kerala			
The Silical Metallurgic Ltd, Wayalur, Distt Palakkad.	Silicomanganese	Mn: 70-75%	3,600
INDSIL Electrosmelts Ltd, Pallatheri, Distt Palakkad.	Silicomanganese	NA	NA
	Ferrosilicon	NA	NA
INDSIL Hydro Power & Manganese Ltd, Distt Palakkad, Kerala	Silicomanganese	Mn: 55% (min.), Si: 23-27%, C: 0.1 % (max.)/0.2% (max.)/0.5% (max.), S: 0.02% (max.), P: 0.15% (max.)	14,400
Shri Laxmi Electro Smelters (Pvt.) Ltd, Industrial Development Area Erumathala, P.O. Aluva- 683 105.	Ferrosilicon	NA	NA
Madhya Pradesh			
MOIL Ltd, (formerly Manganese Ore India Ltd) Ferro-manganese Plant, Bharweli (Manjhara), Distt Balaghat.	HC ferromanganese	Mn:78±1%, P: 0.35% (max.), C: 6.8%	10,000

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FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Jalan Ispat Castings Ltd, Industrial Area, Meghnagar, Distt Jhabua.	Silicomanganese	Mn: 60-65%, Si: 15-20%, C: 2% (max.), P: 0.35%	12,000
Crescent Alloys Pvt. Ltd, Seoni.	Ferrosilicon Ferromanganese	N.A. N.A.	4,500 (Total)
S.R Ferro Alloys, Jhabua	Silicomanganese	NA	8,639
Maharashtra			
Chandrapur Ferro Alloy Plant (Erstwhile Maharashtra Electrosmelt Ltd), Distt Chandrapur- 442 401.	HC ferromanganese	Mn: 70-74 % and 74-78% , Si: 1.5% (max.), C: 6.8%, P: 0.43%. (max.)	1,90,000
	MC ferromanganese	Mn : 70-74% and 74-78% , Si: 2% max., C: 1 - 3% , P: 0.4% max.	1,800
	LC ferromanganese	Mn: 70-74% and 74-78% , Si: 2% (max.), C: 1.5% max., P: 0.4% max.	NA
	Silicomanganese	Mn: 60-65% and 65% min., Si: 15-20%, C: 2 % max., P: 0.35% max.	1,30,000
Nagpur Power & Industries Ltd, P.O. Khandelwal Nagar, Distt Nagpur.	Silicomanganese HC ferromanganese	Mn: 60-65%, P: 0.35% Mn: 70-75%, P: 0.4%	NA NA
Bharat Pulverising Mills Ltd, Andheri, Mumbai.	Ferromolybdenum Ferrotungsten Ferrovanadium	NA NA NA	200 (Total)
Sunbel Alloys Co. of India Ltd, Thane-Belapur, Mumbai.	Ferromolybdenum Ferrosilicon Ferrotungsten Ferrovanadium	NA NA NA NA	300 (Total)
Natural Sugar and Allied Ind. Ltd, Sainagar, Ranjani, Distt Osmanabad.	HC Ferromanganese	Mn: 70-75%, Si: 2-2.5%, P: 0.4%, C: 6-8%	16,500
	Silicomanganese	Mn: 60-65%, Si: 13-15%, P: 0.3%, C: 2-2.5%	16,500
Mahavir Ferro Alloys, Paonakhari, Distt Bhandara	Ferroalloys	NA	100
Minex Metallurgical Co. Ltd, Distt Nagpur	Ferrotitanium	NA	250
Meghalaya			
Maithan Alloys Ltd, Distt Rio Bhoi.	Ferromanganese	NA	28,000
Odisha			
Ferro Alloys Corporation Ltd, (Ferro Chrome Plant Randia), D.P. Nagar, Randia, Distt Bhadrak.	HC ferrochrome/ Charge-chrome	Cr: 60-64%, Si: 3-4%, C: 6-8%, P: 0.03-0.05% (max.), S: 0.03-0.05% (max.)	75,000
Tata Steel Ltd, Ferro Manganese Plant, Joda, Distt Keonjhar	HC ferromanganese Silicomanganese	Mn: + 70%, C: 6-8 %, Si :0.3-2%, P: 0.2-0.4%, Mn: 46-48%,	50,400 -
			65,000

(contd)

FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Tata Steel Ltd, (Charge-chrome Plant), Bamnival, Distt Keonjhar.	Ferrochrome	NA	65,000
	Charge-chrome	Cr: 60% (min.), Si: 4% (max.) , C: 8% (max.), P: 0.03% (max.), S: 0.03% (max.)	55,000
	Ferromanganese	Mn: 46 to 49%	50,400
Balasore Alloys Ltd, Balgopalpur, Distt Balasore. (Formerly Ispat Alloys Ltd)	HC ferrochrome	Cr: 60-63% ,Si: 3.5% (max.) Grade I C: 8.0% (max.), Cr: 57-60% S: 4.0% (max.) Grade II, C: 8.0% (max.)	1,50,000
Jeypore Sugar Co. Ltd, (Ferro-manganese Plant) Distt Rayagada.	HC ferrochrome	Cr: 60-65%, P: 0.055%, C: 2%, S: 0.05%, Si: 4%, Fe: Balance	22,000
	Silicomanganese	Mn: 60-65%, Si: 15-18%, C: 2% max.	22,000
J.B. Ferro Alloys, At Tanto, P.O. Bhadrashahi, Keonjhar.	LC ferromanganese	NA	200
IDCOL Ferro Chrome & Alloys Ltd, Jajpur Road, Distt Jajpur.	HC ferrochrome	Cr: 62-65%, Si: 1.5 to 8%, C: 8% (max.)	18,000
Indian Metals & Ferro Alloys Ltd, (IMFA)	HC ferrochrome/ Charge-chrome	Cr: 60%	62,500
Indian Metals & Ferro Alloys Ltd, (IMFA), Therubali, Distt Rayagada.	Ferrosilicon	Si: 70-75%,	61,000
	HC ferrochrome	Cr: 60%	1,16,400
Superb-Metal Alloys (Pvt.) Ltd, Rairangpur, Distt Sundergarh.	Ferrocolumbium Ferromolybdenum Ferrotungsten Ferrovanadium	NA	300 (Total)
Jabamayee Ferro Alloys Ltd, Sukinda, Distt Jajpur	HC Ferrochrome	NA	15,660
M M Minerals & Alloys Pvt. Ltd, Jamirdiha, Distt Mayurbhanj.	HC Ferrochrome	NA	25,000
T S Alloys Ltd, Anantapur, Cuttack.	Ferrochrome	NA	59,400
Stork Ferro and Mineral Industries Pvt. Ltd, Somnathpur, Distt Balasore	Silicomanganese	NA	25,000
	Ferromanganese	NA	29,700
	Ferrochrome	NA	25,000
Aarti Steel Ltd, Ghantikhal, Distt Cuttack.	Ferrochrome	NA	25,000
Kalinga Ferro Ispat Pvt. Ltd, Mandia, Distt Jajpur	HC Ferrochrome	NA	8052
Puducherry			
The Silical Metallurgic Ltd	Ferrosilicon	–	10,560
	Ferro-silicon-magnesium	–	1,800
VSK Ferro Alloys Ltd, Thuthipet.	Ferrosilicon	Si: 72.3%, C: 0.15%, S: 0.051%, Mn: 0.55%, P: 0.042%, Fe: 26.13%	3,000
Snam Alloys (Pvt.) Ltd, Kariamankam, Distt, Puducherry.	Ferrosilicon	NA	12,000
	Ferro-silicon-magnesium Ferrochrome	Si: 14.56%, P: 0.197%	

(contd)

FERRO-ALLOYS

Table- 3 (contd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
Tata Steel Alloys Ltd, Ferro Alloy Plant, Cuttack.	Ferrochrome		50,000
Punjab			
Mehra Ferro-Alloys, Verka, Amritsar.	Ferromolybdenum Ferrovanadium Ferrotitanium Ferrotungsten Ferroboron	NA	300 (Total)
Sikkim			
Akshay Ispat & Ferro Alloys Ltd, Mamring, Namchi, Distt South Sikkim.	Ferrosilicon	NA	6,000
Telangana			
VBC Ferro Alloys Ltd, Village Rudraram, Patancheru Mandal Distt Medak.	Ferrosilicon Ferrochrome Silicomanganese/ Ferromanganese	– –	10,000 27,000 31,500
Shree Raghvendra Ferro Alloys Pvt. Ltd, Nalgonda	Silicomanganese	NA	15000
Nava Bharat Ventures Limited, Paloncha, Distt Khammam,	HC Silicomanganese HC ferromanganese	NA	1,25,000
Uttar Pradesh			
The India Thermit Corp. Ltd, Fazalganj, Distt Kanpur.	Ferromolybdenum Ferrotitanium Ferrochrome Ferroboron Chromium metal LC ferromanganese Ferrovanadium	NA	300 (Total)
Hindustan Ferro-Alloys, Hamirpur.	Ferrosilicon	NA	3,200
West Bengal			
Bhaskar Shrachi Alloys Ltd, Durgapur	Silicomanganese	Si: 15%	24,000
Cosmic Ferro Tech. Ltd, Bishnupur, Distt Bankura.	HC ferromanganese Silicomanganese	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%	45,375
Sri Gayatri Minerals Pvt. Ltd, WBIIDC Growth Centre, Bishnupur, Bankura.	HC silicomanganese	Mn: 60-65% & 65% min., Si: 15% min. & 16% min., C: 2% max., P: 0.3% max., S: 0.03% max.	24,000
Industrial Metals & Ferro Alloys, Jamuria, Burdwan.	LC ferrotitanium LC ferrochrome	NA NA	20 20
Hira Concast Ltd, Salanpur, Burdwan.	Silicomanganese Ferromanganese	NA NA	11,455 15,225
Karthik Alloys Ltd (I & II), Durgapur.	MC silicomanganese	Mn: 54-56%, C: 0.2-0.5% Si: 22-25% P: 0.15-0.2%, S: 0.05%	19,000

(contd)

FERRO-ALLOYS

Table- 3 (concl'd)

Name and location of the plant	Product	Specifications	Installed capacity (tpy)
	LC silicomanganese	Mn: 53-55%, C: 0.15-0.2% Si: 25-28% P: 0.15-0.2%, S: 0.05%	NA
Maithan Alloys Ltd, Burdwan.	Ferromanganese Silicomanganese Ferrochrome	NA	94,600 (Total)
Monnet Ferro Alloys Ltd, Burdwan.	Silicomanganese	NA	12,500
Shyam Ferro Alloys Ltd, Palitpur Road, Burdwan, Dewandighi (Katwa Road)	HC silicomanganese HC ferromanganese HC ferrochrome	NA	1,04,957 (Total)
Srinivasa Ferro Alloys Ltd, Durgapur, Burdwan.	HC ferromanganese	Mn: 70-74%, 74-76% Si: 1.5% max., C: 6-8%, P: 0.25%, 0.30% and 0.40% max., S: 0.03% max.	10,800
	HC silicomanganese	Mn: 60-65% & 65% min. Si: 15% min. & 16% min. C: 2% max., P: 0.3% max., S: 0.03% max.	23,400
	LC silicomanganese	NA	5,400
Shri Vasavi Industries Ltd, WBIIDC Industrial Growth Centre, Bishnupur, Distt Bankura.	HC ferrochrome	Cr: 58-60%, Si: 2-4%, C: 8% max., P: 0.05% max. S: 0.05% max.	45,000 (16MVA 1No. & 12MVA 1 No.)
Modern India Con-Cast Ltd, WBIIDC Industrial Growth Centre, Bishnupur, Distt Bankura.	Bulk ferroalloys	–	22,000
Rohit Ferro Tech. Ltd, Bishnupur, Distt Bankura	HC ferrochrome	Cr: 60% (min.), C: 8% (max.) Si: 3.5% (max.), P: 0.03% (max.) S: 0.04% (max.)	45,375
Sharp Ferro Alloys, Durgapur	HC silicomanganese	NA	42,500
Nilkantha Ferro Ltd, Bankura	HC silicomanganese Silicomanganese Slag	NA NA	39,960 40,200
Lalwani Ferro Alloya Ltd, Kolkata	Silicomanganese HC ferromangenesese	NA NA	48,780 69,285
Ispat Damodar Pvt. Ltd, (Sponge Iron Plant), Nabagram, PS-Neturia, Digha, Purulia.	Ferroalloys	NA	40,000
Sonic Thermal Pvt. Ltd, (Ferro Alloys Plant), Namobandh, Sitarampur, Bankura.	Silicomanganese	NA	39,500
Shree Ambry Ispat Pvt. Ltd, Basdebpur, Distt Bankura.	Ferromanganese Silicomanganese Ferrosilicon	NA NA NA	22,600 17,400 7,600

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

Source: Information collected by IBM

Table – 4 : Consumption* of Principal Ferroalloys, 2017-18 (P)

	(In tonnes)
	Consumption
Ferrochrome	14600
Ferromanganese	50800
Ferrosilicon	23400
Silicomanganese	122600

Note: 1) *Includes actual reported consumption and/or estimates made wherever required, and paucity of data, hence consumption may not be complete

ENVIRONMENT

Studies reveal that depending on the ferroalloy manufactured, waste generation per day in 35 tpd and 50 tpd ferrosilicon and ferrochrome plants 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

Waste from ferroalloys industries could be effectively utilised, 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 for 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 ferrovanadium by Essel Mining & Industries Ltd, Gujarat.

The implementation of the Kyoto Protocol by the European Union provides significant opportunities for Ferroalloys 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 major ferroalloys producing countries were China, South Africa, India, Russia and Kazakhstan. The production of ferroalloys in China during 2019 was 36,577 thousand tonnes, while production of ferroalloys in South Africa during 2019 was 3,807 thousand tonnes. Kazakhstan reported production of 1,900 thousand tonnes of ferrochrome during 2019. The markets for the bulk alloys like high-carbon ferromanganese, silicomanganese, ferrosilicon and high-carbon ferrochrome showed varied responses to the fluctuations in steel and stainless steel production which seem to have influence as per the different circumstances that prevailed in different markets.

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

Table – 5 : World Production of Ferroalloys, 2017 to 2019 (By Principal Countries)

		(In tonnes)		
Country	Ferroalloys	2017	2018	2019
China	Fe-Alloys	32887000	31234000	36577000
	Si-Metal	2204700	2404500	2400000 ^(e)
South Africa	Fe-Alloys	4058305	4081452	3806766
Kazakhstan	FeCr	1640299	1772508	1899941
	FeSiCr	110497	110500 ^(e)	110500 ^(e)
	FeSiMn	123977	137710	123528
	FeSi	60001	65405	79930
	Other Fe-Alloys	-	-	-
India ^b	FeAl	4423	2752	1545
	FeCr	944000	944000	927273

(contd)

FERRO-ALLOYS

(Table-5 contd)

Country	Ferroalloys	2017	2018	2019
	FeMn	518000	518000	45818
	FeMo	1205	1003	540
	FeSiMg	15978	19180	14173
	FeSiMn	311326	345291	320939
	FeSi	90000	90000	7636
	FeTi	281	118	126
	FeV	1331	1013	660
Ukraine	FeMn	211124	155869	172508
	FeNi	74459	79537	79334
	FeSiMn	875031	912300	858708
	FeSi	118371	97084	97000
	Other Fe-Alloys	87094	100764	100000
Russia	FeCr	434452	332261	384089
	FeMn	253000	281000	273000
	FeMo	4726	4700	4700
	FeNi	20000	20000	20000
	FeSiCr	4200	4200	4200
	FeSiMn	44917	43334	51774
	FeSi	840352	928797	846579
	FeV	12588	11383	10894
	Other Fe-Alloys ^(e)	34000	34000	34000
	Si-Metal ^(e)	48000	48000	48000
	Spiegeleisen ^(e)	7000	7000	7000
Finland	FeCr	415000	497000	505000
Japan	FeMn	456460	456518	462740
	FeNi	312324	339844	337790
	Other Fe-Alloys	79809	73094	74015
USA	Fe-Alloys (FeSi & Si-Metal)	415000	430000	320000
Zimbabwe ^(x)	FeCr	328386	315685	310000
Norway	FeMn	400800	400000	400000
	FeSiMn	284500	328000	288000
	FeSi ^(x)	240813	265964	-
	Si-Metal	150000	150000	150000
Korea, Rep. of	FeMn ^(e)	355000	355000	355000
	FeSiMn ^(e)	196000	196000	196000
	Other Fe-Alloys ^(e)	4200	4200	4200
	Fe-Alloys ^(e)	30000	41000	46000

(contd)

FERRO-ALLOYS

(Table-5 conclud)

Country	Ferroalloys	2017	2018	2019
Georgia	FeMn ^(e)	4500	4500	4500
	FeSiMn	289765	335013	284688
Australia	FeMn & FeSiMn ^(g)	245000	275000	257000
	Si-Metal	49000	42000	52000
New Caledonia	FeNi	269961	260206	247746
Brazil	FeCr ^(d)	171531	175061	136780
	FeMn	149000	168000	151000
	FeNi ^(y)	43800	42310	45543
	FeNb	58690	60000	60000
	FeSiMg ^(e)	20000	20000	20000
	FeSi ^{(e)(y)}	100000	100000	100000
	Other Fe-Alloys ^(e)	40000	40000	40000
	Si-Metal	110000	190000	190000
Mexico	FeMn	90010	95349	72937
	FeSiMn	148142	151991	154209
Bhutan	FeSi*	109000	120900	138900
Indonesia	FeNi	108810	124340	128565
	FeSiMn ^(e)	6000	5000	4000
Iceland	FeSi	116811	116889	120255
Spain	FeMn ^(e)	132100	126000	120000
	FeSiMn ^(e)	138700	140000	120000
	FeSi ^(e)	95000	95000	90000
	Si-Metal ^(e)	7500	7500	7000
France	FeMn	95400	90000	85000
	FeSiMn	58400	55000	55000
	FeSi	35000	35000	35000
	Other Fe-Alloys	80000	50000	70000
	Si-Metal	108000	100000	100000
Other countries	All types rounded	1387450	1315884	1302743

Source: BGS, World Mineral Production, 2015-2019 BGS

Note: FeAl : Ferroaluminium; FeCr : Ferrochrome; FeSiCr : Ferro-silico-chrome; FeSiMg : Ferro-silico-magnesium;
 FeMn : Ferromanganese; FeSiMn : Ferro-silico-manganese; FeMo : Ferromolybdenum; FeNi : Ferronickel;
 FeNb : Ferroniobium; FeSi : Ferrosilicon; FeTi : Ferrotitanium; FeV : Ferrovandium

(e) Estimate

(b) Years ended 31st March following that stated

(d) Including ferro-silico-chrome

(f) Including ferro-silico-manganese

(g) Years ended 30th June of that stated

(x) Sales

(y) Nickel Content

FOREIGN TRADE

Exports

In 2019-20, exports of ferroalloys (total) decreased by 12% to 17,15,936 tonnes in 2019-20 from 19,42,134 tonnes in the previous year. In terms of value, ferroalloys exports also decreased to ₹ 11,810 crore in 2019-20 from ₹ 14,962 crore in 2018-19.

Out of total export, in terms of quantity, majority were exports of ferrochrome (43%) followed by ferro-silico-manganese (40%), ferromanganese (15%) and ferrosilicon (1%). The other ferroalloys together accounted for the remaining 1% of exports in 2019-20. Exports were mainly to China (19%), UAE (13%), Republic of Korea (12%), Japan (10%), Taiwan (7%), and Malaysia, Egypt, Bangladesh, Italy & Thailand (3% each) (Tables-6 to 26).

Table – 6 : Exports of Ferroalloys : Total (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1942134	149622740	1715936	118100715
China	283739	20881513	331317	22028833
UAE	204353	16099834	218679	16890630
Korea, Rep. of	292555	22518888	204280	13597765
Japan	190276	14856701	171239	11785135
Taiwan	136245	10194388	123436	7974909
Malaysia	49193	3636918	59792	4168892
Egypt	24869	1854674	48078	3289427
Bangladesh	45596	3178638	50318	3199605
Italy	82740	5344752	53557	3065406
Thailand	52324	3800798	44892	2986137
Other countries	580244	47255636	410349	29113976

Figures rounded off

Table – 7 : Exports of Ferroboron (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	47	9921	51	11143
South Africa	38	7986	40	8928
Oman	8	1608	10	1844
Turkey	1	135	1	361
UAE	-	-	++	10
Brazil	++	75	++	++
Malaysia	++	99	-	-
Pakistan	++	15	-	-
Spain	++	5	-	-

Figures rounded off

Table – 8 : Exports of Ferrochrome (By Countries)

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	860183	66563284	732432	48794987
China	280293	20528577	329483	21572846
Korea, Rep. of	256081	19533000	182087	12051454
Japan	81313	6904567	69265	4818220
Taiwan	77657	6151261	58349	3938225
USA	37074	3080543	21093	1414263
Mexico	10867	869877	11520	791894
Italy	20265	1696276	10249	717701
Thailand	9727	767348	9845	672212
Netherlands	26656	2080344	11131	558689
Canada	5654	459071	4469	321525
Other countries	54595	4492421	24941	1937955

Figures rounded off

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

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	64	-	-
Saudi Arabia	++	51	-	-
Singapore	++	12	-	-

*Figures rounded off***Table – 10 : Exports of Ferromanganese
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	271433	22752482	262268	19796177
UAE	120296	10165512	117268	9730669
Oman	8316	656591	19831	1425975
Canada	8706	669828	14550	924740
Egypt	8592	645851	13583	907178
Taiwan	10854	775605	11204	673611
Korea, Rep. of	18649	1525638	9815	652808
Thailand	7966	611246	8801	580900
Libya	5697	529322	7398	552243
Turkey	5875	514966	7546	500772
Japan	6141	464909	6650	446110
Other countries	70341	6193015	45621	3401173

*Figures rounded off***Table – 11 : Exports of Ferromolybdenum
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	330	444660	132	146529
Oman	212	273801	98	103025
Thailand	12	15269	13	15517
UAE	1	1302	6	7419
Taiwan	-	-	5	4907
Philippines	4	4453	4	4208
Indonesia	3	7167	1	2951
Peru	-	-	1	2382
Bangladesh	-	-	1	1786
Tanzania	++	205	++	990
Malaysia	-	-	1	774
Other countries	98	142462	2	2569

Figures rounded off

**Table – 12 : Exports of Ferronickel
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	55	++	197
Kyrgyzstan	-	-	++	197
Kenya	++	55	-	-

Figures rounded off

**Table – 13 : Exports of Ferroniobium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	46	99697	27	52730
UAE	23	47176	26	49886
Malaysia	4	6967	1	1137
Egypt	-	-	++	602
Indonesia	++	281	++	563
Pakistan	++	877	++	386
Saudi Arabia	13	25777	++	122
Chile	-	-	++	34
Taiwan	6	18578	-	-
Singapore	++	41	-	-
Spain	++	2	-	-

Figures rounded off

**Table – 14 : Exports of Ferrophosphorus
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	149	17076	80	10878
Sweden	120	16028	80	10724
China	-	-	++	149
Tanzania	-	-	++	5
Oman	20	683	-	-
Saudi Arabia	9	349	-	-
Brazil	++	16	-	-

Figures rounded off

**Table – 15 : Exports of Ferrosilicochrome
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	31	3	638
Saudi Arabia	-	-	3	553
Tanzania	++	31	++	85

Figures rounded off

**Table – 16 : Exports of Ferro-silico-magnesium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	8610	951637	7155	770987
Mexico	1668	189109	3248	347590
Turkey	965	103091	948	94163
USA	2104	209831	610	63087
UAE	175	20845	440	49859
Sri Lanka	237	35047	221	33946
Saudi Arabia	807	87298	276	30921
Oman	259	29581	206	23661
South Africa	358	41757	235	22704
Brazil	278	32244	130	13845
Slovenia	193	22657	125	13262
Other countries	1566	180177	715	77948

Figures rounded off

**Table – 17 : Exports of Ferro-silico-Manganese
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	766932	53296562	682847	44374535
Japan	102167	7444263	94743	6469404
UAE	80729	5479497	94271	6122804
Malaysia	47962	3517294	58630	4041654
Taiwan	47318	3205752	53252	3311030
Bangladesh	40545	2714947	46520	2886269
Egypt	14804	1078426	33180	2273351
Italy	54720	3019431	37978	2033422
Thailand	34455	2358413	26108	1675513
Saudi Arabia	15610	1089395	24765	1580837
Nigeria	23053	1600330	21021	1336308
Other countries	305569	21788815	192378	12643945

Figures rounded off

**Table – 18 : Exports of Ferrosilicon
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	25752	2580250	18757	1601612
Bangladesh	2283	210695	2927	213965
Brazil	2063	239223	1713	177352
Egypt	663	59142	1137	90789
Korea, Rep. of	1222	133745	843	90655
Oman	1688	154882	1030	80563
Italy	3920	345110	1596	78204
Slovenia	864	100777	603	70337
USA	842	107851	519	67567
Saudi Arabia	526	53742	789	65559
UAE	1026	98360	724	65533
Other countries	10657	1076722	6875	601087

Figures rounded off

**Table – 19 : Exports of Ferrotitanium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1199	284737	3227	678896
China	500	115663	1615	359401
Saudi Arabia	189	49518	640	104539
UK	80	17641	235	54364
UAE	44	11092	170	42790
Belgium	75	12470	149	28847
Japan	45	9879	120	26317
Oman	37	8701	76	15044
Netherlands	45	11084	65	12482
Korea, Rep. of	115	27155	59	12257
Iran	7	2577	25	6536
Other countries	62	18957	73	16318

Figures rounded off

**Table – 20 : Exports of Ferrotungsten
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2	6443	1	1223
Pakistan	1	3237	++	1103
Turkey	++	288	++	120
Brazil	-	-	++	++
Finland	1	2755	-	-
Philippines	++	164	-	-

Figures rounded off

**Table – 21 : Exports of Ferrovanadium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	474	1832964	532	883571
Belgium	230	975012	225	398727
UAE	39	50510	103	140008
Netherlands	30	130078	82	121635
China	-	-	52	84841
Iran	++	1572	20	48270
Bahrain	-	-	20	31877
Thailand	6	29845	16	29814
Oman	80	352978	8	12390
Brazil	-	-	2	5191
Bangladesh	1	1839	1	3778
Other countries	88	291130	3	7041

Figures rounded off

**Table – 22 : Exports of Ferrocolumbium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1	1089	1	2901
Peru	-	-	1	2303
Pakistan	1	1032	++	338
UK	++	56	++	260

Figures rounded off

**Table – 23 : Exports of Ferrozirconium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3	1546	5	2914
Brazil	2	1260	4	2491
Israel	-	-	1	375
Saudi Arabia	-	-	++	48
Turkey	1	266	-	-
Bahrain	++	20	-	-

Figures rounded off

**Table – 24 : Exports of Ferroselenium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	917	++	1365
Malaysia	++	917	++	1365

Figures rounded off

**Table – 25 : Exports of Ferroalloys (Others)
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	6973	778927	8418	969356
UAE	1957	214139	4971	570010
Saudi Arabia	883	145105	908	159374
South Africa	574	100705	438	66109
Italy	1367	98871	893	58557
Bahrain	148	24320	246	32691
France	-	-	++	17574
Japan	533	23193	360	15153
Bangladesh	223	27891	130	13103
UK	84	5762	50	6542
Oman	2	269	51	5581
Other countries	1203	138672	370	24661

Figures rounded off

**Table – 26 : Exports of Ferrocobalt
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	398	++	75
Germany	-	-	++	44
Philippines	-	-	++	16
USA	-	-	++	15
Japan	++	398	-	-

Figures rounded off

Imports

Imports of ferroalloys (total) decreased marginally by 5% to 4,83,129 tonnes in 2019-20 from 5,08,009 tonnes in the previous year. In terms of value, the ferroalloys imports also decreased to ₹ 6,343 crore in 2019-20 from ₹ 7,573 crore in 2018-19. Out of total imports in terms of quantity, imports of ferrosilicon accounted for about

45% followed by ferromanganese (20%), ferronickel (23%), ferrochrome (6%) and chargechrome (1%). Other ferroalloys together accounted for the remaining 5% of the imports in 2019-20. Imports were mainly from Bhutan (27%) followed by Indonesia & Malaysia (14% each), China (13%), South Africa (8%), Albania (4%), Republic of Korea & Singapore (3% each), Japan (2%) and Brazil (1%) (Tables-27 to 45).

**Table – 27 : Imports of Ferroalloys : Total
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	508009	75734229	483129	63432055
Indonesia	44088	11913893	69185	13259249
Bhutan	107226	9260646	131540	9056395
China	71606	8470144	62727	5937286
Singapore	13607	5373716	13993	5460831
Malaysia	84628	6209192	66873	4484823
Japan	18369	4309616	9890	3936189
Korea, Rep. of	16671	4463478	12163	3778102
Albania	9297	1481235	17536	3256870
South Africa	44771	3419082	38817	2928911
Brazil	11609	4034060	5106	2297825
Other countries	86137	16799165	55299	9035573

Figures rounded off

**Table – 28 : Imports of Ferroboron
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1025	181136	1166	190258
China	923	165083	1141	186545
Hong Kong	96	15247	24	3421
Germany	-	-	1	275
USA	++	40	++	16
Russia	6	713	-	-
UK	++	53	-	-

*Figures rounded off***Table – 29 : Imports of Ferrochrome
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	30817	5594084	29999	3893862
China	8199	1724289	19661	2496163
Russia	7584	1401223	2409	393701
Turkey	6463	1086896	1959	237426
Brazil	142	29537	748	123472
Kazakhstan	537	87502	933	115119
Albania	2087	336074	908	113384
Oman	1703	131469	1313	96758
Netherlands	781	159785	301	86003
UAE	322	47835	476	47219
USA	59	13817	254	42378
Other countries	2940	575658	1037	142238

*Figures rounded off***Table – 30 : Imports of Charge-chrome
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	22081	1446124	5654	328099
South Africa	22054	1441690	5505	315048
UAE	-	-	149	13051
Malta	27	4434	-	-

Figures rounded off

**Table – 31 : Imports of Ferromanganese
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	123110	9695114	95708	6607464
Malaysia	63670	4354039	45134	2906642
South Africa	18578	1387302	29124	2006120
Korea, Rep. of	14757	1751558	10376	1069698
France	10621	658722	4714	246444
UAE	1516	96179	1556	92927
Singapore	200	11152	1543	80874
Japan	3388	419894	576	69333
China	1608	217531	1007	42955
Canada	-	-	538	31159
Norway	2520	308968	411	22745
Other countries	6252	489769	728	38567

Figures rounded off

**Table – 33 : Imports of Ferronickel
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	88321	24319793	113151	25036566
Indonesia	44088	11913893	69185	13259249
Japan	14818	3838494	9095	3590022
Albania	7210	1145161	16628	3143486
Singapore	11309	2410929	10670	2109365
Macedonia	1840	1592170	1873	902598
Netherlands	-	-	1982	611693
Switzerland	2122	437535	1911	410875
Dominican Rep.	812	777633	358	364044
Brazil	4911	1186766	334	274275
UAE	-	-	103	99497
Other countries	1210	1017210	1012	271461

Figures rounded off

**Table – 32 : Imports of Ferromolybdenum
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2372	3109991	2531	3120809
Korea, Rep. of	1420	2362971	1678	2527510
Austria	331	142320	507	216941
Hong Kong	140	171613	86	103779
Switzerland	-	-	59	67694
UAE	160	203910	40	49808
Singapore	20	23251	40	48664
Japan	40	25452	40	27676
China	13	23912	20	24719
South Africa	-	-	20	20250
Germany	9	17720	20	19395
Other countries	239	138844	21	14373

Figures rounded off

**Table – 34 : Imports of Ferroniobium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3176	6022085	2777	5483411
Singapore	1571	2883101	1582	3203128
Brazil	1200	2169493	765	1532168
Canada	249	608094	171	414428
Netherlands	68	180061	45	89805
Hong Kong	-	-	60	88767
China	++	827	28	76340
UAE	78	159968	17	32526
Malaysia	1	871	104	28538
Korea, Rep. of	-	-	6	17614
UK	++	18	++	85
Other countries	10	19651	++	11

Figures rounded off

**Table – 35 : Imports of Ferrophosphorus
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3589	102217	2577	71362
China	2074	64918	1306	40231
Vietnam	1311	25689	1152	26187
Germany	70	3304	8	2083
Hong Kong	54	1411	57	1707
Kazakhstan	-	-	54	1155
Bhutan	50	5811	-	-
UK	30	1072	-	-
USA	++	12	-	-

Figures rounded off

**Table – 36 : Imports of Ferro-silico-Chrome
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	29	5221	37	14448
Norway	2	1816	9	9957
Kazakhstan	-	-	27	3660
Netherlands	-	-	1	831
Zimbabwe	27	3309	-	-
USA	++	84	-	-
UK	++	12	-	-

Figures rounded off

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

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3135	204719	6172	344397
Malaysia	2098	131577	5784	317586
Saudi Arabia	350	24452	300	16637
Sweden	-	-	20	4011
France	20	2305	20	2154
China	40	4319	11	1635
Zambia	18	1072	27	1190
Slovak Rep.	-	-	10	1183
Hong Kong	500	36809	-	-
Singapore	100	3801	-	-
Switzerland	++	185	-	-
Other countries	9	199	-	-

Figures rounded off

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

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2271	243875	3127	294704
Bhutan	1142	122397	2212	208660
China	980	103133	697	62755
Taiwan	-	-	81	7111
Hong Kong	42	4705	61	6436
Norway	21	2702	42	5218
South Africa	-	-	25	3129
Belgium	36	4703	10	1396
Bulgaria	25	3270	-	-
Thailand	25	2942	-	-
USA	++	23	-	-

Figures rounded off

**Table – 39 : Imports of Ferrosilicon
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	221510	20909220	215181	16171708
Bhutan	105854	9116808	129152	8839191
China	53610	4932343	36025	2598422
Malaysia	18759	1713414	15322	1153155
France	4351	596909	4991	700107
South Africa	4024	583793	4044	570728
Norway	5239	738259	3604	535690
Russia	7477	722940	6656	513848
Brazil	5325	638500	3238	353666
Netherlands	4337	525032	2310	261592
Iceland	2644	386567	1960	229053
Other countries	9889	954655	7879	416256

Figures rounded off

**Table – 40 : Imports of Ferrotitanium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1378	408958	1158	299794
Canada	301	90164	583	118565
UK	754	237106	441	115789
Netherlands	221	50930	74	20230
Russia	32	9523	26	6474
USA	20	4621	14	4390
Korea, Rep. of	-	-	19	4198
UAE	1	227	1	146
Estonia	49	16387	-	-

Figures rounded off

**Table – 41 : Imports of Ferrovandium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	714	2881355	596	1143394
Germany	361	1332287	216	342960
Japan	-	-	124	224188
Russia	-	-	92	174162
Korea, Rep. of	60	278688	56	151770
Netherlands	95	331054	33	107490
China	120	719556	14	78472
USA	50	123484	39	35971
Switzerland	-	-	10	13218
Czech Republic	-	-	10	12928
Malaysia	-	-	2	2223
Other countries	27	96286	++	15

*Figures rounded off***Table – 42 : Imports of Ferrotungsten
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	27	65196	5	9250
China	19	43855	4	7519
UK	++	13	++	1439
USA	2	6094	++	292
Netherlands	4	9489	-	-
Hong Kong	2	5744	-	-

*Figures rounded off***Table – 43 : Imports of Ferrozirconium
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	297	39969	342	41178
China	295	39672	342	41178
UAE	2	297	-	-

Figures rounded off

**Table – 44 : Imports of Ferroalloys (Others)
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4157	505175	2948	379605
China	3725	430706	2470	280353
Argentina	192	25918	288	37461
Japan	3	2316	39	21395
Turkey	-	-	68	10917
USA	17	5101	17	9782
Italy	-	-	19	9264
Canada	2	1080	4	2789
Russia	1	714	11	2623
Singapore	-	-	1	1978
Spain	-	-	1	1461
Other countries	218	39340	31	1582

Figures rounded off

**Table – 45 : Imports of Ferrocobalt
(By Countries)**

Country	2018-19 (R)		2019-20 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	-	-	++	1746
Germany	-	-	++	935
USA	-	-	++	811

Figures rounded off

FUTURE OUTLOOK

Depending on the process of steel making and the type of steel being manufactured, the requirement of different ferroalloys varies widely.

Indian Ferroalloys Industry has immense potential and capability to compete in the international market. On the positive side, India produces some of the finest ferroalloys in the world. Indian ferroalloys are extensively preferred in Europe. India exports potential is indeed bright with very high growth prospects.

As per the steelworld report, ferroalloys Industry is estimated to grow at a CAGR of 5.9% between 2017 to 2025 and is expected to reach a valuation of US\$ 188.7 billion by 2025.

India is expected to show strong growth in usage of steel in the coming years because of its robust economy, massive infrastructure needs and expansion of industrial production. India is expected to become one of the leading steel consuming nations in the next decade. In this scenario, the Ferroalloys Industry estimates that the consumption of ferroalloys will increase domestically and internationally in the coming years. Some of the Ferroalloy Producers have already gone for expansion and some new units are coming up.

As per the National Steel Policy, 2017, Ferroalloy industry is a power intensive industry. Hence, captive power generation in the ferroalloys plants will be extensively supported. Since the demand for ferro-alloys is likely to grow along with steel production in the country, the Industry would have to be encouraged to set up larger units to achieve adequate economies of scale. Efforts in the direction of providing necessary raw materials linkages and stable supply of power to the Ferroalloy units must be rendered priority.