



Indian Minerals Yearbook 2021

(Part- II : Metals & Alloys)

60th Edition

FERRO ALLOYS

(ADVANCE RELEASE)

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

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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, ferrovandium, 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 ferrosilicomanganese 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, 2020 & 2021 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 2019-20 was about 9,21,000 tonnes which decreased to 8,68,000 in 2020-21.

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 during 2019-20 and 2020-21 is not available.

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 to 428 tonnes in 2020-21 as compared 527 tonnes in 2019-20.

Ferrotungsten

The consumption and production of ferrotungsten in 2020-21 were not reported in the Organised Sector.

Ferrovandium

Production of ferrovandium in 2019-20 was 1013 tonnes which decreased to 664 tonnes in 2020-21.

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 2018-19 to 2020-21 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.

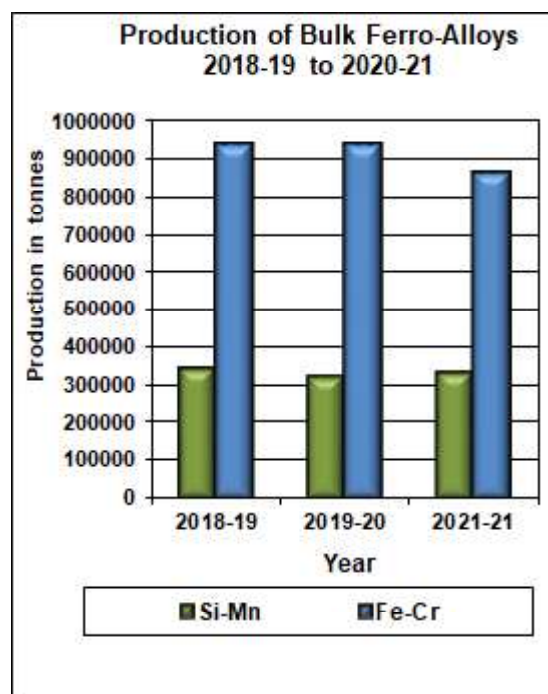


Table – 2 : Production of Ferroalloys, 2018-19 to 2020-21

Ferroalloys	2018-19	2019-20	2020-21
(In tonnes)			
A) Bulk Ferroalloys			
Ferromanganese	518000	NA	NA
Silicomanganese	342591	320594	329295
Ferrosilicon	90000	NA	NA
Ferrochrome	944000	944000	868000
Charge-chrome	NA	NA	NA
B) Noble Ferroalloys			
Ferromolybdenum	1003	527	428
Ferrovandium	1013	665	664
Ferrotungsten	NA	NA	NA
Magnesium-ferro-silicon	19180	13930	13930
Ferroaluminium	2752	1461	1119
Ferro-silicon-zirconium	NA	NA	NA
Ferrotitanium	118	121	249
Ferroboron	NA	NA	NA
Ferroniobium	NA	NA	NA

Source: Monthly Statistics of Mineral Production (MSMP), IBM, March, 2021 Issues.

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	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, Jamgaon, Raigarh (Chhattisgarh)	Silicomanganese	NA	42057
Goa			
Karthik Alloys Ltd, Cuncoim, Distt South Goa.	HC Silicomanganese	Mn:60-65% Si ₂ :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 Kachhh	Silicomangenesse	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	NA	14,400
	Silicomanganese	NA	
Shivam Iron & Steel Co. Ltd, Ferro Alloys Division, Jambad, Udnabad, Giridih	Ferromanganese	NA	37,400
	Silicomanganese		
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

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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	NA	300
	Ferromolybdenum		(Total)
	Ferrotungsten Ferrovanadium		
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 HC silicomanganese	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. Mn: 60-65% & 65% min. Si: 15% min. & 16% min. C: 2% max., P: 0.3% max., S: 0.03% max.	10,800 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 Alloy Ltd, Kolkata	Silicomanganese HC ferromanganese	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 2020 was 36,000 thousand tonnes, while production of ferroalloys in South Africa during 2020 was 2984 thousand tonnes. Kazakhstan reported production of 1847 thousand tonnes of ferrochrome during 2020. 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, 2018 to 2020 (By Principal Countries)

		(In tonnes)		
Country	Ferroalloys	2018	2019	2020
China	Fe-Alloys	31234000	36577000	36000000
	Si-Metal	2404500	2400000	2400000
South Africa	Fe-Alloys	4081452	3806766	2984105
Kazakhstan	FeCr	1772508	1858130	1841309
	FeSiCr	110500	110500	110500
	FeSiMn	137710	123528	122743
	FeSi	65405	79930	80000
India ^b	FeAl	2752	1461	1119
	FeCr	944000	921000	868000

(contd)

FERRO-ALLOYS

(Table-5 contd)

Country	Ferroalloys	2018	2019	2020
	FeMn	518000	0	0
	FeMo	1003	527	428
	FeSiMg	19180	14173	9700
	FeSiMn	342591	320594	329295
	FeSi	90000	0	0
	FeTi	118	121	249
	FeV	1013	665	634
Ukraine	FeMn	155869	172508	117215
	FeNi	79537	79334	73700
	FeSiMn	912300	858708	850000
	FeSi	97084	97000	97000
	Other Fe-Alloys	100764	100000	100000
Russia	FeCr	332261	384089	390000
	FeMn	281000	273000	240000
	FeMo	4700	4700	4700
	FeNi	20000	20000	20000
	FeSiCr	4200	4200	4200
	FeSiMn	43334	51774	50000
	FeSi	928797	846579	830000
	FeV	11383	10894	12000
	Other Fe-Alloys ^(e)	34000	34000	34000
	Si-Metal ^(e)	48000	48000	48000
	Spiegeleisen ^(e)	7000	7000	7000
Finland	FeCr	497000	505000	498000
Japan	FeMn	456518	462740	400331
	FeNi	339844	337790	234505
	Other Fe-Alloys	73094	74015	49544
Korea, Rep. of	FeMn ^(e)	355000	355000	355000
	FeSiMn ^(e)	196000	196000	196000
	Other Fe-Alloys ^(e)	4200	4200	4200

(contd)

FERRO-ALLOYS

(Table-5 conclud)

Country	Ferroalloys	2018	2019	2020
Brazil	FeCr ^(d)	175061	136780	254346
	FeMn	168000	151000	150000
	FeNi ^(y)	42310	45543	46000
	FeNb	60000	60000	60000
	FeSiMg ^(e)	20000	20000	20000
	FeSi ^{(e)(y)}	100000	100000	100000
	Other Fe-Alloys ^(e)	40000	40000	40000
	Si-Metal	190000	340000	340000
Other countries	FeCr	540821	519995	497543
	FeSiMn	758956	683117	571383
	FeSi	910538	645172	594287
	FeMo	25779	26212	24218
	FeMn&FeSiMn	1445432	1260537	1165627
	Si-Metal	439558	428106	402234
	FeNi	654547	648213	640518
	FeV	14400	14900	13800
	FeAlloys	565210	435026	400841
	FeNi	7500	7500	7500
	FeSiCr	3000	3000	3000

Source: BGS, World Mineral Production, 2016-2020 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 : Ferrovanadium

(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 2020-21, exports of ferroalloys (total) increased by 7% to 18,43,322 tonnes in 2020-21 from 17,15,919 tonnes in the previous year. In terms of value, ferroalloys exports also increased to ₹ 12,773 crore in 2020-21 from ₹ 11,810 crore in 2019-20.

Out of total export, in terms of quantity, majority were exports of ferrochrome (39%) followed by ferro-silico-manganese (41%), ferromanganese (18%) and ferrosilicon (1%). The other ferroalloys together accounted for the remaining 1% of exports in 2020-21. Exports were mainly to China (19%), UAE (11%), Republic of Korea (9%) and Japan (7%), (Tables-6 to 26).

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1715919	118100709	1843322	127735114
China	331317	22028834	365306	25279096
UAE	218678	16890628	210748	15800630
Korea, Rep. of	204280	13597764	175560	12094753
Japan	171239	11785134	144689	10340378
Taiwan	123436	7974907	133816	8647484
Italy	53556	3065405	119785	7649075
Indonesia	18540	1306989	59316	4451852
Egypt	48076	3289428	65616	4396277
Thailand	44891	2986138	53086	3680146
Turkey	21104	1380315	48615	3311803
Other countries	480802	33795167	466785	32083620

Figures rounded off

**Table – 7 : Exports of Ferroboron
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	51	11143	39	9728
South Africa	40	8928	31	7527
Turkey	1	361	2	524
Ukraine	-	-	2	381
Oman	10	1844	2	306
Egypt	-	-	1	303
Brazil	++	++	1	73
Malaysia	-	-	++	31
Saudi Arabia	-	-	++	5
Canada	-	-	++	3
Other countries	++	10	++	2

Figures rounded off

**Table – 8 : Exports of Ferrochrome
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	732431	48794984	720539	49939983
China	329483	21572846	362570	24871853
Korea, Rep. of	182087	12051454	160428	11043385
Indonesia	809	67186	45272	3456230
Taiwan	58349	3938225	49667	3334406
Japan	69265	4818220	35780	2639979
Thailand	9845	672213	13532	1049023
Italy	10249	717701	11882	814645
Canada	4469	321526	8921	616025
Mexico	11520	791894	6533	434927
Netherlands	11131	558689	7601	364171
Other countries	45224	3285030	18353	1315339

Figures rounded off

**Table – 9 : Exports of Ferromanganese
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	262265	19769179	335229	23997006
UAE	117268	9730668	105006	8680752
Italy	2786	171809	25342	1691665
Taiwan	11204	673610	19999	1207025
Netherlands	1641	129632	16932	1185968
USA	3247	232268	16110	1183401
Canada	14550	924740	17642	1177511
Brazil	5851	430846	16958	1165667
Oman	19831	1425975	16102	1038465
Egypt	13583	907178	13001	823569
Turkey	7546	500773	12826	822519
Other countries	64758	4668680	75311	5020464

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	129	146529	279	324540
Oman	98	103025	220	240963
South Africa	-	-	25	34174
Philippines	4	4208	6	10964
Thailand	13	15517	6	6459
UAE	6	7419	4	5669
Indonesia	1	2951	3	5515
Argentina	-	-	4	4931
Taiwan	5	4907	5	4703
Saudi Arabia	++	697	4	4029
Peru	1	2382	1	2063
Other countries	1	5423	1	5070

Figures rounded off

**Table – 11 : Exports of Ferronickel
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	197	77	65052
China	-	-	76	63882
Kyrgyzstan	++	197	1	1170

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	26	52730	14	25114
UAE	26	49886	14	23884
Malaysia	++	1137	++	640
Egypt	++	602	++	534
France	-	-	++	36
Canada	-	-	++	20
Indonesia	++	563	-	-
Pakistan	++	386	-	-
Saudi Arabia	++	122	-	-
Chile	++	34	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	80	10878	77	11038
Sweden	80	10724	76	10909
Saudi Arabia	-	-	1	129
China	++	149	-	-
Tanzania	++	5	-	-

Figures rounded off

**Table – 14: Exports of Ferrosilico-chrome
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3	638	32	12095
Turkey	-	-	12	10152
Nepal	-	-	16	1287
Jordan	-	-	2	436
Saudi Arabia	3	553	2	216
Japan	-	-	++	4
Tanzania	++	85	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	7153	770985	4192	483234
Mexico	3248	347590	1051	112845
UAE	440	49859	489	60077
USA	610	63087	540	60061
Turkey	948	94163	488	54045
Italy	54	5711	273	31379
Sri Lanka	221	33946	157	24779
South Africa	235	22704	178	18309
Oman	206	23661	140	17898
Saudi Arabia	276	30921	148	17520
Taiwan	10	1101	105	12460
Other countries	905	98242	623	73861

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	682846	44374533	764747	50326047
Japan	94743	6469404	99815	7081430
UAE	94271	6122804	100922	6409352
Italy	37978	2033422	80714	4977728
Taiwan	53252	3311030	63878	4068495
Egypt	33180	2273351	52366	3552108
Malaysia	58630	4041654	42338	2868163
Turkey	10018	600495	33880	2296815
Bangladesh	46520	2886269	36256	2208861
Thailand	26108	1675513	30156	1956520
Saudi Arabia	24765	1580837	20194	1304853
Other countries	203381	13379754	204228	13601722

Figures rounded off

**Table – 17 : Exports of Ferro silicon
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	18754	1601611	11236	1194260
UAE	724	65533	2012	196679
Brazil	1713	177352	766	87456
Slovenia	603	70337	687	82827
USA	519	67566	512	77741
Bangladesh	2927	213965	872	72541
Mexico	301	43213	457	62460
Oman	1030	80563	616	61957
Saudi Arabia	789	65558	548	53001
Italy	1596	78205	379	48893
Malaysia	284	20757	499	42796
Other countries	8268	718562	3888	407909

*Figures rounded off***Table – 18 : Exports of Ferro-titanium
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3227	678896	2553	567131
China	1615	359401	1049	190297
Korea, Rep. of	59	12257	279	73593
UAE	170	42790	240	67047
Japan	120	26317	220	57155
Spain	-	-	120	31706
UK	235	54364	99	26611
Netherlands	65	12482	100	24288
Malaysia	2	565	99	18119
Bulgaria	5	1227	64	14949
USA	19	2671	50	14655
Other countries	937	166822	233	48711

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	1223	++	1150
South Africa	-	-	++	740
Brazil	++	++	++	234
Qatar	-	-	++	148
Venezuela	-	-	++	13
Kenya	-	-	++	12
Spain	-	-	++	3
Pakistan	++	1130	-	-
Turkey	++	120	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	531	883571	240	346840
UAE	103	140008	102	141985
Thailand	16	29814	42	64449
Netherlands	82	121635	40	55916
Oman	8	12390	32	49299
Belgium	225	398727	20	26199
Brazil	2	5191	2	3803
France	-	-	1	2162
Turkey	1	1832	1	1508
Indonesia	++	617	++	507
Malaysia	++	317	++	386
Other countries	94	173040	++	626

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1	2901	++	1522
UAE	-	-	++	849
UK	++	260	++	648
Qatar	-	-	++	25
Peru	1	2303	-	-
Pakistan	++	338	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5	2914	3	1644
Brazil	4	2491	3	1644
Israel	1	375	-	-
Saudi Arabia	++	48	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	1365	++	979
Malaysia	++	1365	++	979

Figures rounded off

**Table – 24 : Exports of Ferroalloys (Others)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	8417	969357	4065	427722
UAE	4971	570010	989	112902
Italy	893	58557	1195	84723
Saudi Arabia	908	159374	301	52652
South Africa	438	66109	260	41345
Oman	51	5581	228	28886
Bangladesh	130	13103	228	27861
Turkey	42	3912	143	26042
Japan	360	15153	264	11048
Nepal	20	1595	154	10445
Bahrain	246	32691	37	4951
Other countries	358	43272	266	26867

Figures rounded off

**Table – 25 : Exports of Ferrocobalt
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	75	++	29
Germany	++	44	++	15
USA	++	15	++	14
Philippines	++	16	-	-

Figures rounded off

Imports

Imports of ferroalloys (total) decreased marginally by 13% to 4,21,980 tonnes in 2020-21 from 4,83,127 tonnes in the previous year. In terms of value, the ferroalloys imports also decreased to ` 5,531 crore in 2020-21 from ` 6,343 crore in 2019-20. Out of total imports in terms of quantity, imports of ferrosilicon accounted for about

46% followed by ferromanganese (15%), ferronickel (18%), ferrochrome (9%) and chargechrome (3%). Other ferroalloys together accounted for the remaining 9% of the imports in 2020-21. Imports were mainly from Bhutan (25%) followed by Indonesia (14.1%), Malaysia (12%), China (11%) and South Africa (7%). (Tables-27 to 44).

**Table – 26 : Imports of Ferroalloys : Total
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	483127	63432050	421980	55319083
Indonesia	69185	13259249	62209	12174907
Bhutan	131540	9056395	105907	8388867
Singapore	13994	5460830	10508	5161202
China	62726	5937287	48375	5045760
Korea, Rep. of	12163	3778102	16970	4414616
Malaysia	66873	4484822	51284	3293125
Brazil	5106	2297825	7416	2660712
South Africa	38817	2928910	32104	2270907
Russia	9194	1090807	20599	1965356
Japan	9890	3936189	5505	1258262
Other countries	63639	11201634	61103	8685369

Figures rounded off

**Table – 27 : Imports of Ferroboron
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1166	190257	1238	197093
China	1141	186545	1224	196384
UK	-	-	14	625
USA	++	16	++	84
Hong Kong	24	3421	-	-
Germany	1	275	-	-

*Figures rounded off***Table – 28 : Imports of Ferrochrome
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	29999	3893862	39002	4897369
China	19661	2496163	19525	2513774
Russia	2409	393701	6249	819171
Brazil	748	123472	2528	366851
Turkey	1959	237426	2770	322344
Kazakhstan	933	115119	2195	232759
Netherlands	301	86003	800	119875
Switzerland	270	38580	844	112104
USA	254	42378	600	86659
Sweden	3	649	825	75307
Albania	909	113385	562	68139
Other countries	2552	246986	2104	180386

*Figures rounded off***Table – 29 : Imports of Charge-chrome
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	5654	328099	14004	741433
South Africa	5505	315048	12018	636251
Switzerland	-	-	987	54623
Mozambique	-	-	999	50559
UAE	149	13051	-	-

Figures rounded off

**Table – 30 : Imports of Ferromanganese
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	95706	6607464	66089	4785976
Malaysia	45134	2906642	29550	1808754
Korea, Rep. of	10376	1069697	13807	1305274
South Africa	29125	2006120	16662	1118462
Norway	411	22745	2489	219991
Japan	576	69333	1170	132227
Vietnam	76	10280	540	65473
UAE	1556	92927	794	45248
Netherlands	286	7870	500	44368
China	1007	42955	115	18140
Sri Lanka	-	-	189	13706
Other countries	7159	378895	273	14333

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	113151	25036565	79737	16875880
Indonesia	69185	13259249	62174	12168876
Singapore	10670	2109365	7757	1630801
Japan	9095	3590022	3331	704757
Dominican Rep.	358	364044	765	616318
Brazil	334	274275	1057	524809
Albania	16628	3143486	1903	467983
Canada	100	15472	1591	267660
UAE	103	99497	175	178249
USA	41	11929	463	118709
Switzerland	1911	410875	302	101890
Other countries	4726	1758351	219	95828

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2531	3120808	2883	3115738
Korea, Rep. of	1678	2527510	2697	2928669
Switzerland	59	67694	100	100055
UAE	40	49808	3	78222
Germany	20	19395	3	4439
Canada	-	-	++	33
USA	++	18	-	-
Austria	507	216941	-	-
Hong Kong	86	103779	-	-
Singapore	40	48664	-	-
Japan	40	27676	-	-
Other countries	61	59323	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2778	5483410	3026	5857814
Singapore	1582	3203128	1681	3397956
Brazil	765	1532168	879	1480909
Canada	171	414428	275	653843
UAE	17	32526	40	94965
Hong Kong	60	88767	68	70128
Netherlands	45	89805	27	62304
Switzerland	-	-	30	47403
Senegal	-	-	20	36901
Malaysia	104	28538	4	9651
Belgium	-	-	2	3223
Other countries	34	94050	++	531

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2577	71363	2006	55172
Vietnam	1152	26187	989	24022
China	1306	40231	619	22162
Kazakhstan	54	1155	216	4895
Germany	8	2083	125	2429
Sweden	-	-	3	1250
Russia	-	-	27	618
Hong Kong	57	1707	27	603
Italy	-	-	++	173
USA	-	-	++	20

Figures rounded off

**Table – 35 : Imports of Ferro-silico-Chrome
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	37	14448	-	-
Norway	9	9957	-	-
Kazakhstan	27	3660	-	-
Netherlands	1	831	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	6172	344396	10497	546336
Bhutan	-	-	2964	236017
Malaysia	5784	317586	5673	234668
Australia	-	-	1620	63433
Singapore	-	-	200	7172
China	11	1635	10	1462
Slovak Rep.	10	1183	10	1240
France	20	2154	10	1222
Netherlands	-	-	10	1122
Saudi Arabia	300	16637	-	-
Sweden	20	4011	-	-
Other countries	27	1190	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	3128	294705	2765	289625
Bhutan	2212	208660	1720	186911
China	697	62755	946	93015
Taiwan	81	7111	54	5210
Marshall Island	-	-	38	3420
Belgium	10	1396	7	1069
Hong Kong	61	6436	-	-
Norway	42	5218	-	-
South Africa	25	3129	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	215181	16171706	194439	16370102
Bhutan	129152	8839190	101183	7963507
China	36025	2598422	23053	1869232
Malaysia	15322	1153154	15976	1234247
Russia	6656	513847	14265	1133643
Netherlands	2310	261593	9149	958416
Norway	3604	535691	4332	645226
UAE	1383	105024	8287	596568
France	4991	700107	3190	508442
South Africa	4044	570727	3256	499144
Brazil	3238	353666	2952	288143
Other countries	8456	540285	8796	673534

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1157	299792	462	109565
UK	441	115789	255	59672
Netherlands	74	20230	69	20561
Canada	583	148565	70	15641
Russia	26	6474	58	11924
Taiwan	-	-	10	1725
USA	14	4390	++	42
Korea, Rep. of	19	4198	-	-
UAE	++	146	-	-

Figures rounded off

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	595	1143397	480	613762
Germany	216	342960	188	260094
Korea	56	151770	76	131424
Japan	124	224188	113	124205
Switzerland	10	13218	20	32604
Czech Republic	10	12928	30	29993
UAE	-	-	48	26724
Netherlands	33	107490	5	8711
UK	++	15	++	7
Russia	92	174162	-	-
China	14	78472	-	-
Other countries	40	38194	-	-

*Figures rounded off***Table – 41 : Imports of Ferrotungsten
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	4	9250	13	23282
China	4	7519	9	15511
Belgium	-	-	4	7448
USA	++	292	++	171
Turkey	-	-	++	152
UK	++	1439	-	-

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

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	342	41178	374	51237
China	342	41178	346	46248
Hong Kong	-	-	15	3395
UAE	-	-	8	1371
UK	-	-	5	223

Figures rounded off

**Table – 43 : Imports of Ferroalloys (Others)
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	2149	379604	4965	787297
Japan	39	21395	890	296556
China	2470	280353	2528	269832
Singapore	1	1978	713	103277
Canada	4	2789	395	44132
UAE	4	576	45	22985
USA	17	9782	40	15746
Argentina	288	37461	144	14356
Indonesia	-	-	35	6031
Malaysia	-	-	81	5805
Turkey	68	10917	54	4922
Other countries	58	14353	40	3655

Figures rounded off

**Table – 44 : Imports of Ferrocobalt
(By Countries)**

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	++	1746	++	1402
Germany	++	935	++	1402
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.