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Volume 2 CHROMIUM STEEL AND ALLOYS

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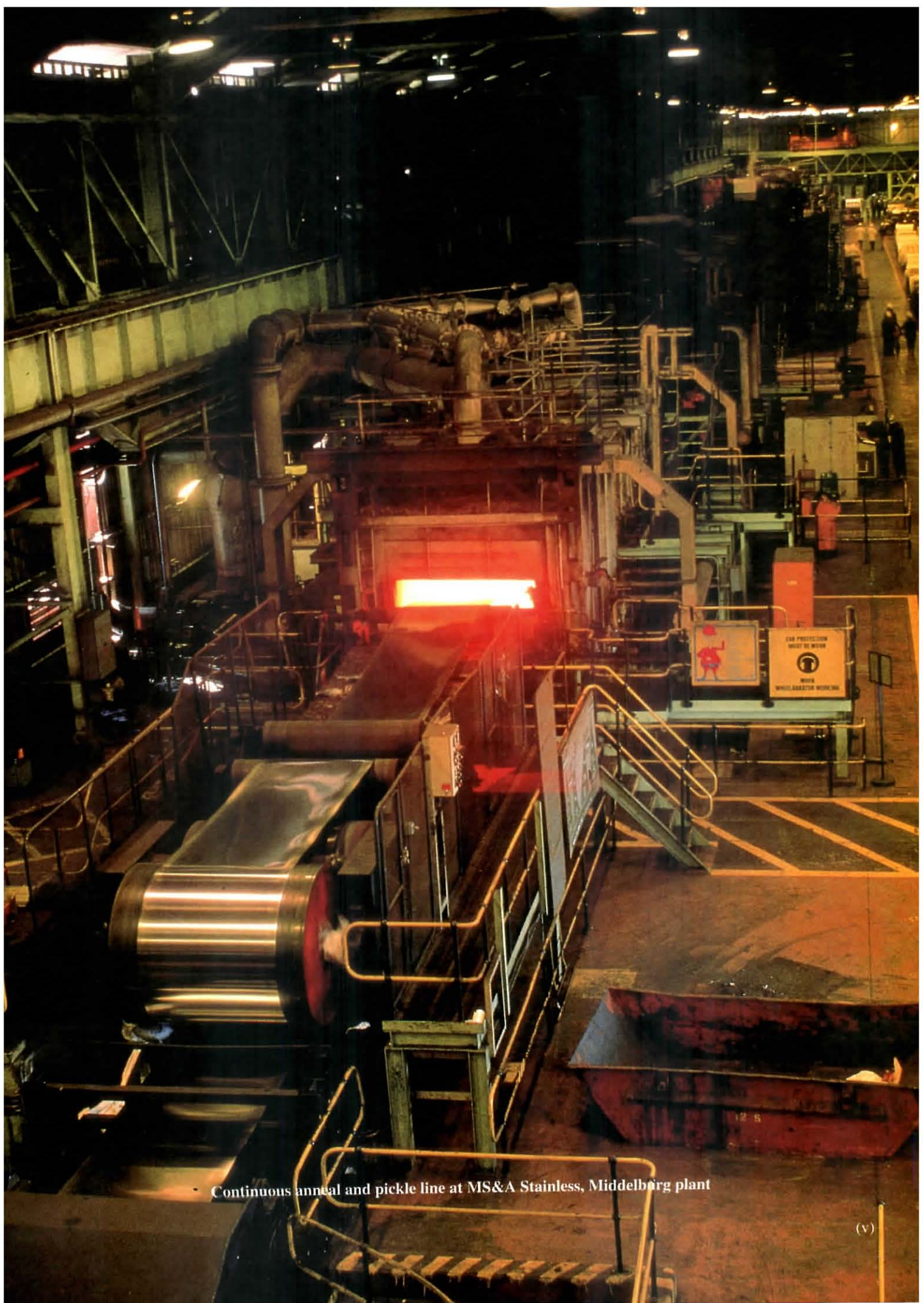
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INFACON 6

(Incorporating INCSAC 1)

Volume 2

CHROMIUM STEEL AND ALLOYS

Edited by
H. W. GLEN

**The conference was organised by
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and
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CONTENTS

Volume 2

	<i>Page</i>
Preface	xiv
Committees and Sponsors	xv
Units and Ferroalloy Nomenclature	xvi
 SECTION 1	
Plenary and Keynote Addresses	
The potential of the 'chrome chain' for South Africa, P.R. Hatty	3
The continuous casting of stainless steels, J.K. Brimacombe, S. Kumar, C.O. Hlady and I.V. Samarasekera	7
Dephosphorization of stainless steels, N. Sano and H. Katayama	25
Nitrogen control in chromium steels, R.J. Fruehan	35
The potential of chromium as an alloying element, G.T. van Rooyen	43
Developments in zirconia sensors during the 1980's – Laboratory and in-plant applications in iron- and steelmaking, M. Iwase	49
 SECTION 2	
Chromium Steel and Alloys	
The austenite–ferrite transformation in 11,5 per cent chromium steels, P.G.H. Pistorius, H.J. de Klerk and G.T. van Rooyen	65
High-chromium controlled-hardenability steels, J. Hewitt	71
Optimization of the AOD process at POSCO, H.S. Song, S.M. Byun, D.J. Min, S.K. Yoon and S.Y. Ahn	89
Mechanical properties of a 316L forging material modified for resistance to sensitization, E. Protopappas, C.A. Smal and F.G. de Lange	97
A simple experimental technique for the determination of MnO activities at 1600°C in (MnO–MgO–SiO ₂) slags saturated with (MnO–MgO) solid solutions, J.M.A. Geldenhuis, E.B. Pretorius and R.J. Dippenaar	105
Carbothermic reduction and desulphurization of chromite with nickel oxide and sulphide, W. Dresler, B.C. Jena and A. McLean	111
Design criteria for stainless-steel structural members, P. van der Merwe and G.J. van den Berg	117
The effect of anisotropy on the fatigue and fracture of a 12 per cent chromium steel, M.B. Cortie, C.J. Fletcher and W. Veldsman	121
Metallography of high-carbon ferrochromium, A. Lesko, E. Navara and T.R.C. Fernandes	131
The toughness of the heat-affected zone of welds in 11,5 per cent chromium steels, J.J.J. Zaayman and G.T. van Rooyen	137
Duplex ferrite–martensite steels containing 16 Wt per cent chromium, R.D. Knutsen and R. Hutchison	143
Reducing the nickel content in metastable austenitic stainless steel, O.E. Schmid and R.D. Knutsen	151
The effect of martensite content on the corrosion and mechanical properties of dual-phase 12 per cent Cr steels, A. van Bennekom, L.M. Matthews, J.N. Tarboton and F.P.A. Robinson	157

Influence of stress and electrochemical effects on initiation and morphology of pits in stainless steels exposed to an aqueous solution of boiling magnesium chloride, D.J. Simbi, M. Dingwiza and B.D. Barker	165
Corrosion resistance of intermediate chromium-alloy steels in mine waters, P.V. Scheers, M.U. Kincer, T. Rumpf and J.J. McEwan	173
Performance of buried 3CR12 pipes in various soil environments, R.T. White and E.A. Duligal	179
The influence of heat-tinted surface layers on the corrosion resistance of stainless steels, T. von Moltke, P.C. Pistorius and R.F. Sandenbergh	185
Analysis of preferred orientations in duplex chromium–nickel steels, H.J. Bunge, A. ul Haq and H. Weiland	197
From niche to commodity, 3CR12 – a ten-year scenario, D.K. Maxwell, K. Dewar and I. Warrington	203
Modern stainless steels to combat chloride-induced localized corrosion, J. Olsson	211
The influence of carbon content on the oxidation and wear resistance of Fe-20% Cr alloy at elevated temperatures, J.D. Xing and Q.D. Zhou	217
The susceptibility of 12 per cent chromium steels to stress–corrosion cracking, R.F. Sandenbergh and P.G.H. Pistorius	225
Stainless steel, with 11 per cent chromium and high yield strength, for welded constructions resistant to corrosion and abrasion, J.C. Charenton, P. Rombeaux, B. Hurtaud and J.M. Hauser	229
Influence of ruthenium content on the corrosion in sulphuric acid of a duplex stainless steel, J.H. Potgieter, W. Skinner and A.M. Heyns	235
The effect of an oxygen atmosphere on the creep-fatigue failure of iron–chromium alloys at 600°C, E. Aghion, J. Ferreira and D. Eliezer	241
Smelting reduction of chromite ore in an oxygen converter, T. Izawa, H. Katayama and N. Sano	245
Ferroalloy production by the smelting–reduction process with a coke packed bed, H. Itaya, S. Taguchi, K. Igawa and T. Nozaki	253
A dynamic process-control system for steel converters, P. Hahlin	259
The role of ferroboron and ferrotitanium in steels: production methods, quality aspects, and addition techniques, R.W. Bebbington	263

CONTENTS

Volume 1

	<i>Page</i>
Foreword	xiii
Preface	xiv
Committees and Sponsors	xv
Units and Ferroalloy Nomenclature	xvi
 SECTION 1	
Plenary and Keynote Addresses	
The status of the ferroalloy industry with special reference to South Africa, H. J. Smith	3
Strategic planning parameters for the steel and ferroalloy industries, P.H. Smith	13
Plasma-arc technology for ferroalloys, Part II, D.R. Mac Rae	21
The availability and marketing of vanadium, T. Jones	37
Commercial relationships now and into the twenty-first century, A.A. Apotsos	43
 SECTION 2	
Ferrochromium	
The reduction of synthetic iron chromite in the presence of various metal oxides – a thermo-analytical study, C.P.J. van Vuuren, J.J. Bodenstein, M. Sciarone and P. Kestens	51
The solid-state reduction of chromite, M.J. Niayesh and R.J. Dippenaar	57
Kinetic aspects of chromite ore reduction with coal at 1200 to 1550°C, D Neuschütz	65
Solid-state fluxed reduction of LG-6 chromite from the Bushveld Complex, P. Weber and R.H. Eric	71
The importance of chromite pretreatment in the production of ferrochromium, M. Honkaniemi, H. Krogerus, J. Daavittila and P. Oikarinen	79
The melting behaviour of chromite ores and the formation of slag in the production of high-carbon ferrochromium, S. Xu and W. Dai	87
Plasma-arc smelting of fine chromium ores, H.R. Larson, J.F. Elliott and B.R. Perkins Jr.	93
The reduction of chromite in Fe–Cr–C–Si alloys, O. Demir and R.H. Eric	99
An evaluation of process alternatives for the reclamation of ferrochromium from slag, J. Visser and W. Barrett	107
Commissioning and operating an induction furnace at Zimasco (KweKwe Division) to melt high-carbon ferrochromium, S. Jena and S.T. Ravasingadi	113
Operating and marketing results of the production of intermediate-carbon ferrochromium in a CLU converter, P.H.F. Bouwer	119
Technology for the combined production of chromium metal and ferrochromium, R.L. Wang . ..	123
 SECTION 3	
Ferromanganese	
A case study of the production of high-grade manganese sinter from low-grade Mamatwan manganese ore, P.C. Pienaar and W.F.P. Smith	131
The production of special SiMn using the gas and powder injection process, R. Kamata, Y. Kizu and H. Tsujimura	139
The development of technology for the production of refined ferromanganese in China, Z. Jinhua and L. Zhizhong	145

High-productivity operation of a shaft-type ferromanganese smelting furnace, S. Suzuki and M. Masukawa	149
The two-stage production of high-carbon ferromanganese in a blast furnace: A method for the treatment of a lean manganese ore, T. Zhang	155
Solid-state decarburization of high-carbon ferromanganese, P.J. Bhonde and R.D. Angal	161
Thermodynamic activity of manganese oxide in ferromanganese slags, and the distribution of manganese between the metal and slag phases, H. Cengizler and R.H. Eric	167

SECTION 4

Silicon and Silicon Alloys

Silicon-metal production on a trial basis from river pebbles originating in Australia, D.P. O'Shaughnessy, A.E. Firek and J.E. Trunzo	177
The effect of reductant moisture on the production of 75 per cent ferrosilicon, D. Retallick	181
The production of high-quality silicon metal at Simcoa, C.J. Szymkowski and J.M. Bultitude-Paull	185
The refining of silicon and ferrosilicon, J.K.S. Tuset	193
On-line laser measurements of silica dust, E.B. Gudmundsson and T. Hannesson	201
The total quality programme at Bozel, J. Finardi and I.C. da Silva	205
Intermetallic compounds in metallurgical silicon, T. Margaria, J.-C. Anglezio and C. Servant	209

SECTION 5

Vanadium, Minor Ferroalloys, and Special Topics

The use of vanadium – A Brief review, P.S. Mitchell	217
Pyrometallurgical processing of vanadiferous slag using plasma/induction heating, R.L. Howard, S.R. Richards, B.J. Welch and J.J. Moore	225
Maximizing the return from electrode investments, C.F. Fulgenzi	233
The heat-recovery system at Minami-Iwate Works, K. Kosaka, H. Ota and Y. Tamura	237
Air-pollution control in the Amazonia region: Dust extraction in a silicon-metal plant, R. Civile and H. de Raedt	243
Electrical factors affecting the economic optimization of submerged-arc furnaces, A. de Waal, I.J. Barker, M.S. Rennie, J. Klopper and B.S. Groeneveld	247
The monitoring and repair of furnace linings at TEMCO, M. Williams	253
Planning for future ferroalloy production in South Africa, M.A. von Below	261

SECTION 6

Ferroalloys in Steelmaking

Wire injection of metallurgical powders into molten metal, G.P. Crawford	271
A semi-continuous autothermic reduction process for the production of ferroniobium, R. de Fúccio, Jr, A. de Fúccio, E.W. Betz and C.A. de F. Sousa	279
The optimization of parameters for the carbothermic production of ferroboron, O. Yücel, O. Addemir and A. Tekin	285

Preface

I express my sincere thanks to the authors who contributed to the papers published in this volume on chromium and alloy steels, presented at INFACON 6. The kind cooperation and collaboration by many authors from many different countries are highly appreciated.

These Proceedings are the first produced on the SAIMM's new desktop publishing system. Although this system has many special features, the tight deadlines have resulted in some inconsistencies such as the use sometimes of decimal points, instead of the decimal commas that are standard South African practice. Other examples include the use of *weight per cent* instead of *mass per cent*, and *calories* or *BTUs* instead of *joules*.

I also thank the members of the Programme Committee responsible for the papers in this volume. Their unstinting efforts and hard work made my task easy. Mr Ian Elsdon-Dew, Mr Jack Hewitt, Mr Corrie Scheepers, Prof. Roelf Sandenbergh, and Dr Pete Wedepohl, as well as our Secretaries, Mrs Pam Smith, Mrs Sam Moodley and Mrs Susan Luddick, conducted their tasks in a most professional manner and in good spirit. They deserve much credit. Mrs Claire Kearney likewise handled the production of the volume in a highly professional manner. She and the Secretariat at the SAIMM went well beyond their call of duty, and I express my personal thanks, and also that of the Programme Committee, for their total dedication.

Furthermore, I thank our Editor, Dr Helen Glen, for her major contribution, and Mr Roy Stimson and Mrs Chrissie Buys for the proof-reading. The cooperation of the Programme Committee of INFACON 6, particularly the Chairman, Dr Nic Barcza, is also gratefully acknowledged.

Many referees gave their time in assisting us to refine the papers, and I thank each and every one of them most sincerely for their kind cooperation.

I trust that this collection of papers and the personal interaction at the Congress will assist in the establishment of closer ties between those interested in chromium steels and alloys.

R. J. DIPPENAAR

Chairman: Technical Programme Committee
INCSAC 1, 1992

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Units and Ferroalloy Nomenclature

Throughout this volume, the use of the International Metric System (SI) units has been preferred.

Some of the relevant basic and derived SI units are as follows:

Basic SI units		
Quantity	Unit	Symbol
Electric current	ampere	A
Electric potential	voltage	V
Length	metre	m
Mass	kilogram	kg
	ton	1000 kg
Time	second	s
Luminous intensity	candela	cd
Temperature	kelvin	K
Amount of substance	mole	mol

Derived SI units			
Quantity	Unit	Symbol	Derivation
Force	newton	N	kg/m/s ²
Frequency	hertz	Hz	s ⁻¹
Pressure, stress	pascal	Pa	N/m ²
Work, energy, quantity of heat	joule (calorie)	J (cal)†	Nm
Capacitance	farad	F	m ⁻² kg ⁻¹ s ⁴ A ²
Electric potential	volt	V	m ² kg s ⁻¹ A ⁻¹
Impedance	ohm	Ω	m ² kg s ⁻¹ A ⁻²
Conductance	siemens	S	m ⁻² kg ⁻¹ s ³ A ²
Power	watt	W	m ² kg s ⁻¹
Quantity of electricity	coulomb	C	SA
Weight	newton	N	m kg s ⁻²
Restarting	ohm. metre	Ωm	
Resistance	ohm	Ω	
Temperature	(centigrade)	°C	
	(kelvin)	K	
Flow	(gas, liquids)	Nm ³	
where N means normal (i.e. STP)			
Feedrate	(solids)	kg/h or kg/min	
Annual production rate or capacity		Kt/a	
Emissivity		E	
Mean particle size		d ₅₀	
Atmosphere		atm	

† (1 cal = 4,1818J)

Since it is not practical to use only the basic and derived units of the accepted system, their decimal multiples and submultiples are formed by adding prefixes to the units. The prefixes are shown in the table below:

Multiples, Prefixes and Symbols		
Factor by which the unit is multiplied	Prefix	Symbol
10 ⁹	giga	G
10 ⁶	mega	M
10 ³	kilo	k
10 ⁻³	milli	m
10 ⁻⁶	micro	μ
10 ⁻⁹	nano	n
10 ⁻¹²	pico	p

Abbreviations/Nomenclature related to Ferroalloys		
Chromium alloys	FeCr	ferrochromium
	ChCr	charge chromium
	HCFerCr	high carbon ferrochromium
	FeCrSi or CrSi	ferrochromium silicide or silico chrome
Manganese alloys	FeMn	ferromanganese
	HCFerMn	high carbon ferromanganese
	FeMnSi or MnSi	ferromanganese silicide or silico manganese
Silicon alloys	FeSi, Si	ferrosilicon, silicon
	CaSi	calcium silicide
Minor ferroalloys (examples)	FeV	ferrovanadium
	FeTi	ferrotitanium
	FeB	ferroboron
Carbide	CaCr	calcium carbide