


# Ferronickel (FeNi)

	Formula	FeNi
	CAS no.	11110-39-7
	Description	Ferronickel is a ferroalloy that contains approximately 35% nickel and 65% iron. It is a shiny metallic solid material and can be obtained from the carbothermic reduction of serpentinic minerals, such as serpentine, limonite, or garnierite. It enables the production of products with special electronic, magnetic and catalytic properties. Ferronickel remains stable under normal storage conditions; however when exposed to carbon oxides in reducing atmospheres, there is a risk of forming the toxic gas nickel carbonyl.

## Physical Properties

General	The melting point and density of ferronickel depends on its nickel content			
Abrasion	good resistance to abrasion			
Corrosion	good resistance to corrosion			
Gravity	high specific gravity			
Magnetism	high magnetism			
	<b>FeNi 25</b>		<b>FeNi 55</b>	
Density	~8,1 g/cm <sup>3</sup>	0,293 lb/in <sup>3</sup>	~8,4 g/cm <sup>3</sup>	0,303 lb/in <sup>3</sup>
Melting point	1450-1480 °C	2642-2696 °F	1430-1460 °C	2606-2660 °F

Source: Volkert, G. & Frank, K.-D.: Die Metallurgie der Ferrolegierungen

## CO2 Emissions

Upstream emission factors	Scope 2	Scope 3
	-	8,676 tCO <sub>2</sub> / t <sub>FeNi</sub>

Source: worldsteel association

## Actually requested materials based on metalshub transactions

Material name	Size [mm]	Composition, as percentages by mass								Packaging	Pallet
		Ni	P	S	C	Si	Cu	Co			
<b>FeNi 15-35</b>	Min.	5	15	-	-	-	-	-	-	Bulk	No pallet
	Max.	50	35	0,03	0,15	0,1	0,5	0,5	1,0		

The above data are based on real data from the metalshub platform. These characteristics are the most common ones in metalshub transactions. We will update the data regularly. [02,2021]

## The DIN standard of Ferrovandium (DIN 17563)

Designation	Composition, as percentages by mass									
	Ni		C		Si	P	S	Co	Cu	Cr
	From (incl.)	Up to (not incl.)	Over	Up to (incl.)	max.	max.	max.		max.	max.
Fe Ni 20 LC	15	25	-	0,03	0,20	0,03	0,03	1)	0,20	0,10
Fe Ni 30 LC	25	35								
Fe Ni 40 LC	35	45								
Fe Ni 50 LC	45	60								
Fe Ni 70 LC	60	80								
Fe Ni 20 LC LP	15	25	-	0,03	0,20	0,02	0,03	1)	0,20	0,10
Fe Ni 30 LC LP	25	35								
Fe Ni 40 LC LP	35	45								
Fe Ni 50 LC LP	45	60								
Fe Ni 70 LC LP	60	80								

### \*Scope 2 emissions (according to greenhouse gas protocol):

Upstream emissions or credits related to procurement/delivery of electricity and steam from site. Upstream emissions of exported by-product gas considering the potential savings in electricity generation.

### \*\*Scope 3 emissions (according to greenhouse gas protocol):

Other upstream emissions or credits related to procurement / delivery of pre-processed materials / by-products from site.

Fe Ni 20 MC	15	25	0,03	1,00	1,00	0,03	0,10	1)	0,20	0,50
Fe Ni 30 MC	25	35								
Fe Ni 40 MC	35	45								
Fe Ni 50 MC	45	60								
Fe Ni 70 MC	60	80								
Fe Ni 20 MC LP	15	25	0,03	1,00	1,00	0,02	0,10	1)	0,20	0,50
Fe Ni 30 MC LP	25	35								
Fe Ni 40 MC LP	35	45								
Fe Ni 50 MC LP	45	60								
Fe Ni 70 MC LP	60	80								
Fe Ni 20 HC	15	25	1,00	2,50	4,00	0,03	0,40	1)	0,20	2,00
Fe Ni 30 HC	25	35								
Fe Ni 40 HC	35	45								
Fe Ni 50 HC	45	60								
Fe Ni 70 HC	60	80								
1) Co/Ni = 1/20 to 1/40, for information only										

### Interesting facts


## High grade FeNi vs Low grade FeNi

The standard ferronickel for steelmaking has a wide range of compositions, from 5% to 25% Ni. Noted two trends in nickel laterites processing, one favoring high-grade ferronickel (35% to 40% Ni) and the other favoring lower grades (20% to 25% Ni). Because the ores processed vary widely in terms of nickel content and other components, it is natural that both lower and higher reduction degrees are used. Low reductions imply higher slag losses and lower nickel recoveries but also lower power and reductant requirements, whereas higher reductions imply the reverse. In some cases, nickel scrap and remelts are added to low-grade FeNi to increase nickel content.

### Applications

- Stainless, special steels and special alloys manufacturing
- Integrated steel and iron
- EAF carbon steel manufacturing
- Use of nickel metal and nickel containing alloys for the production of steel and other alloys powder by atomisation.

### Risk and Safety Statements

Symbols (GHS)			
Hazard Statements		H317	May cause an allergic skin reaction.
		H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
		H350i	May cause cancer via inhalation
		H372	Causes damage to lungs through prolonged or repeated inhalation exposure
Precautionary Statements	Prevention	P202	Do not handle until all safety precautions have been read and understood.
		P261	Avoid breathing dust / fume / gas / mist / vapors / spray.
		P280	Wear protective gloves / eye protection / face protection.
		P284	Wear respiratory protection.
	Response	P302+352	IF INHALED: Call a POISON CENTER or doctor / physician if you feel unwell.
	Storage	P405	Store locked up
Disposal	P501	Dispose of contents/container in accordance with local, regional, national, and international regulations.	

Source: VALE