

Ferroniobium (FeNb)

	Formula	FeNb
	CAS no.	11108-69-3
	Description	Ferroniobium is an important iron-niobium alloy, with a niobium content of 60-70%. It is the main source for niobium alloying of HSLA steel and covers more than 80% of the worldwide niobium production. The niobium is mined from pyrochlore deposits and is subsequently transformed into the niobium pentoxide Nb ₂ O ₅ . This oxide is mixed with iron oxide and aluminium and is reduced in an aluminothermic reaction to niobium and iron. The component metals can be purified in an electron beam furnace or the alloy can be used as it is. For alloying with steel the ferroniobium is added to molten steel before casting.[2] The largest producers of ferroniobium are the same as for niobium and are located in Brazil and Canada.

Physical Properties

General	The melting point and density of ferroniobium depends on its niobium content			
Abrasion	good resistance to abrasion			
Corrosion	good resistance to corrosion			
Gravity	high specific gravity			
Magnetism	high magnetism			
	FeV 60		FeV 80	
Density	~7,0 g/cm ³	0,253 lb/in ³	~6,4 g/cm ³	0,231 lb/in ³
Melting point	1450-1600 °C	2642-2912 °F	1680-1800 °C	3056-3272 °F

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

Actually requested materials based on metalshub transactions

Material name		Size [mm]	Composition, as percentages by mass							Packaging	Pallet
			Nb	Al	C	Si	P	S	Ta		
FeNb 63-70	Min.	5	63	-	-	-	-	-	-	250 kg drums	One way pallet
	Max.	50	70	1,0	0,2	3,0	0,1	0,1	0,5		

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 Ferroniobium, (DIN 17569)

Material name		Composition, as percentages by mass							
		Nb ¹⁾	Al	C	P	S	Si	Ta	Ti
FeNb63	Min.	58	-	-	-	-	-	-	-
	Max.	68	2,5	0,25	0,3	0,2	4	1	2,5
FeNb65	Min.	63	-	-	-	-	-	-	-
	Max.	70	1,5	0,15	0,15	0,08	3	0,5	0,4

1) The niobium content shall not vary by more than 2 % within a consignment.

[Click here for the ASTM standard specification for Ferroniobium \(ASTM A550\)](#)

Interesting facts

A large portion of the global Ferro Niobium supply is manufactured in Brazil and Canada. The most basic definition of the Ferro Niobium production process would be that the Niobium is first mined from Pyrochlore deposits, and is then processed into Niobium Pentoxide (Nb₂O₅). This oxide is mixed with iron oxide as well as aluminium, and then reduced in an aluminothermy reaction to Niobium and Iron. The resulting Ferro Niobium is purified by electron-beam melting, or used as is. For alloying with steel, the Ferro Niobium is added to molten steel before casting.

Ferroniobium Production

Applications

- The largest practical application of Ferro Niobium is in the alloying process of HSLA steel. This steel is then in turn used in automobiles and trucks, bridges, construction cranes, amusement park rides and any other structure that needs to handle a large amount of stress or needs a good strength-to-weight ratio.
- It is also used in vacuum-grade products for super alloy applications such as land-based and jet aircraft engine turbine blades.

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