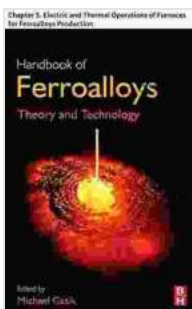


# Chapter: Electric and Thermal Operations of Furnaces for Ferroalloys Production

Ferroalloys are iron-based alloys that contain a high percentage of one or more other elements, such as chromium, manganese, silicon, or vanadium. They are used in the production of steel and other ferrous metals, and are essential for the production of many high-performance materials.



## Handbook of Ferroalloys: Chapter 5. Electric and Thermal Operations of Furnaces for Ferroalloys Production

★★★★☆ 4.9 out of 5

Language : English  
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Screen Reader : Supported  
Enhanced typesetting : Enabled  
Print length : 69 pages



The production of ferroalloys involves a number of complex electric and thermal processes. Furnaces used in the production of ferroalloys must be able to generate and maintain high temperatures, and must be able to control the composition of the molten metal.

### Electric Arc Furnaces

Electric arc furnaces (EAFs) are the most widely used type of furnace for the production of ferroalloys. EAFs use an electric arc to generate heat,

and can reach temperatures of up to 3,000°C.

EAFs are typically used for the production of ferroalloys that have a high melting point, such as chromium and manganese ferroalloys. EAFs can also be used for the production of ferroalloys that have a low melting point, such as silicon and vanadium ferroalloys.

## **Induction Furnaces**

Induction furnaces (IFs) use electromagnetic induction to generate heat, and can reach temperatures of up to 1,600°C. IFs are typically used for the production of ferroalloys that have a low melting point, such as silicon and vanadium ferroalloys.

IFs are also used for the production of ferroalloys that are difficult to produce in EAFs, such as ferroalloys that contain a high percentage of reactive elements, such as aluminum or magnesium.

## **Submerged Arc Furnaces**

Submerged arc furnaces (SAFs) use a submerged arc to generate heat, and can reach temperatures of up to 2,000°C. SAFs are typically used for the production of ferroalloys that have a high melting point, such as chromium and manganese ferroalloys.

SAFs are also used for the production of ferroalloys that are difficult to produce in EAFs or IFs, such as ferroalloys that contain a high percentage of volatile elements, such as zinc or cadmium.

## **Thermal Processes**

The thermal processes involved in the production of ferroalloys include:

\* Melting: The first step in the production of ferroalloys is to melt the raw materials. The raw materials are typically charged into the furnace in a molten state, or are melted in the furnace using an electric arc or induction heating. \* Refining: Once the raw materials have been melted, they are refined to remove impurities. Refining can be carried out using a variety of methods, such as oxidation, reduction, or electrolysis. \* Alloying: The final step in the production of ferroalloys is to alloy the molten metal with the desired elements. Alloying can be carried out using a variety of methods, such as adding the alloying elements to the molten metal, or by reacting the molten metal with a gas or liquid that contains the alloying elements.

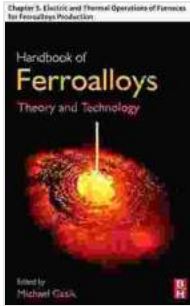
The production of ferroalloys is a complex process that involves a number of electric and thermal operations. Furnaces used in the production of ferroalloys must be able to generate and maintain high temperatures, and must be able to control the composition of the molten metal.

The choice of furnace type and thermal process depends on the specific ferroalloy being produced. EAFs are typically used for the production of ferroalloys that have a high melting point, such as chromium and manganese ferroalloys. IFs are typically used for the production of ferroalloys that have a low melting point, such as silicon and vanadium ferroalloys. SAFs are typically used for the production of ferroalloys that are difficult to produce in EAFs or IFs, such as ferroalloys that contain a high percentage of reactive or volatile elements.

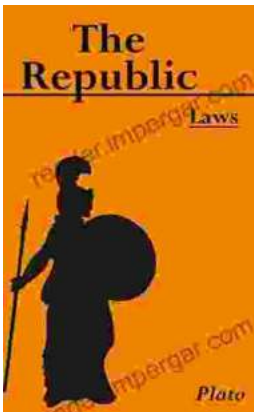
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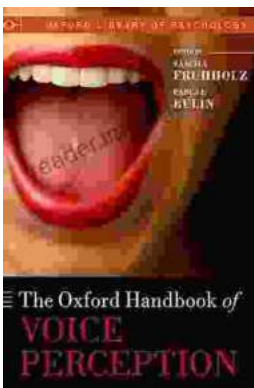


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