Development of Machined Durable Parts of Modified 110g13l Brand Steel

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ABSTRACT

This article provides great opportunities for the modification of steel in improving the quality of steel, reducing the amount of harmful impurities and methods of processing outside the furnace, which allow to seriously affect the quantity, composition, shape and distribution of non-metallic inclusions. The quality of Steel is significantly more deeply influenced by special electrometallurgical methods. These methods are widely used in obtaining high-quality steel castings. The simplest method of processing steel outside the oven is modification. Modified carbon steel is much more economical in properties-terjab approaches leached steel, while modified steel leached by saving and investigation approaches leached steel with valuable and rare additives (Ni, mo and other). Modification with alkaline and alkaline-earth metals greatly increases the quality of steel. The quality of Steel is positively influenced by nitride-forming modifiers

Keywords: Modifier, carbon, alloy, crystallization, hardness, smelting, steel, detail, hardness, temperature.

Introduction

The production of various details and heavy industrial products of high quality, resistant to mowing, high strength grinding cone and the like, which correspond to World Standards, has set an important task for specialists and scientists in this field as improving the existing technology and technology. In turn, the increasing level of equipment improvement at machine-building production enterprises also requires a lot of attention to the quality of metals. Research work carried out in the field of world-wide casting, including: taking into account the working environment of the Alloy Steels, to develop an alloy whose chemical composition of the alloy is of good quality and cost-effective without changing the mechanical properties of the alloy depending on the working conditions of the alloy; the correct selection and improvement of the casting system; it is important to study the effect of the liquid alloy poured from above on the mold sand when pouring the alloy into the mold, and through it on the quality of the casting, to calculate the heat dissipation coefficient of the alloy in the mold when pouring the alloy into the mold, to develop and use new optimal norms of thermal processing and modifiers.

Literature Analysis And Methodology

Researchers from a number of countries have conducted research to improve the efficiency of liquefying steel alloys. In particular, scientists from Nabertherm GmbH (Germany) have developed a technology for liquefying steel alloys, a technology that made it possible to reduce energy consumption from 20% to 25%. Designed to liquefy iron and its alloys, these compact smelting furnaces are unique and have many technical advantages. Manufactured as

tabletop models, these furnaces are used in various laboratory conditions. A practical assistant working with shock absorbers and a cast tube in front of the oven facilitates accurate dosing when pouring the solution. The temperature of liquefaction furnace chambers can reach 1400 °C , 1500 °C or 1700 °C. In this case, it is required to be 80 °C - 110 °C lower than the liquefaction temperature. Researchers from Carbolite Gero (Germany) have a volume of 3000 kg.developed heat-resistant industrial furnaces, in which the temperature of the working chamber goes up to 1800 ° C. High load SF series liquefaction furnaces are available in three models with a maximum operating temperature of 1600 ° C. These furnaces are specially designed to liquefy ferrous metals and their alloys. These furnaces have a solid structure made of large-section hollow sections of steel panels. Silicone carbide heating elements are installed on all four sides of the working chamber and protected by silicone carbide plates.

Scientists from the CIS countries conducted important research on resource conservation in liquefying iron and its alloys (yu.P. Kupryakov, V.S. Chakhotin, Yu.I. Prikhadka). They have improved the design of liquefaction devices to reduce emissions from 20% to 10%. The study concerns the furnace construction, in which the process of charge heating occurs due to the heat of the combustion waste. A.V. Vanyukov, N.M. Dergachev and N.I.Utkin dedicated his research to liquefying technology to reduce metal waste and developed a number of technologies to liquefy alloys. Researchers have developed an alloy melting mode in a liquid bath, which made it possible to prevent the liquid solution from communicating with the atmosphere of the oven.

Experience Part

A number of the following modifiers (Tsilikomarganes, ferrosilisium, ferromarganes, ferrotitan (poroshok), ferrochrome (poroshok), Nikelovoy poroshok, flyuarit, tungsten cobalt (VK), tungsten (pure), zirconium oxide (ZrO), Barium Oxide, calcium (CaCO3), magnesium metallicheskium, magnesium dolomite talk (MgCO3), magnesium dolomite talk (MgCO3), magnesium dolomite talk (MgCO3), we chose aluminum, aluminum kaolin (Al2O3), titanium metallicheski, copper, ferrophosphorus, molybdenum, gadolonium (GD) and selected the most optimal of them. The Faculty of mechanics of Tashkent State Technical University, "Foundry technologies" were added from various modifiers in the induction smelting furnace in laboratory conditions and measured in laboratory conditions of the MTM (SRMZ)plant to check the hardness (NV), and the following results were obtained and described in the table and graph.

As can be seen from this table and graph, after the addition of the optimal modifiers selected to increase the durability of parts made of steel of the 110g13l brand, a lot of work was carried out to create new varieties of steels that are resistant to mowing, with a high strength.

This scientific study is based on the principle of operation of scanning electron microscopes EVO-MA-10 on the interaction of electron rays with the surface of the object. Electron Rays continuously scan this part of the surface of the object from which the image is formed using a microscope. In this case, each point of the object's surface, within the boundaries of the field of view of microscopes, is indicated by the corresponding point of the resulting image. When an electronic beam interacts with the surface of an object, several response signals appear at the same time. Depending on which signal detector is turned on, microscopes produce a specific image. Microscopes measure the length of the projection of geometric distances in the horizontal plane, that is, the distance between the corresponding points is determined on the flat and horizontally oriented surface of the object.

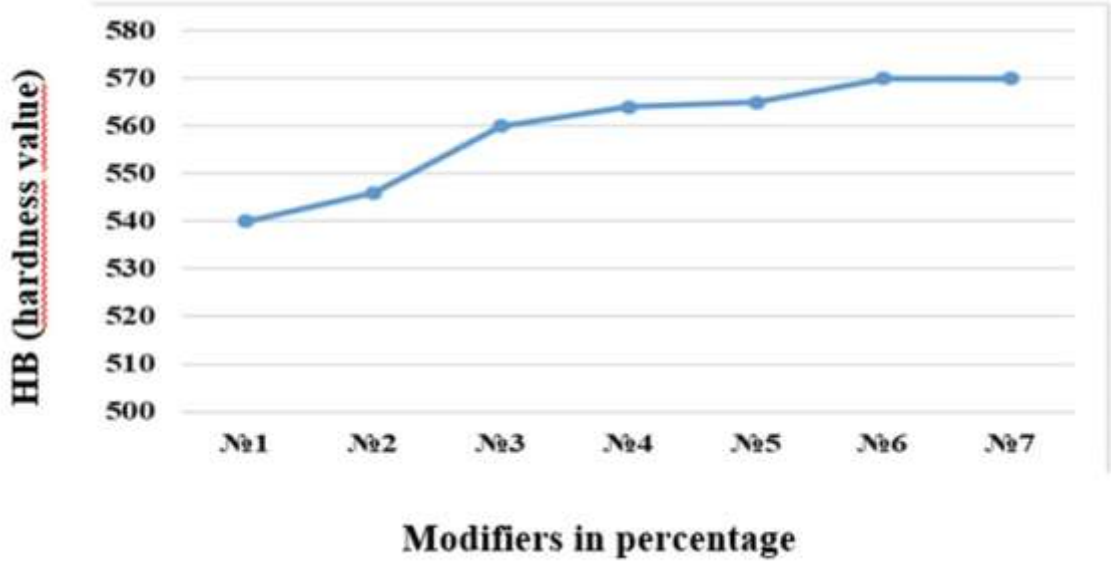
Table 1.

№	Name of modifiers	HB(hardness value)
1	Ferrotitan	540
2	Ferrachram	546
3	Copper	560
4	Ferrasilis	564
5	Aluminum kaolin	565
6	Magnesium	570
7	Aluminum	570

Table 1. The difference in hardness of the modifiers added to the casting.

Several research works were carried out at the induction melting furnace (INDUCTION MELTING MACHINE) in the laboratory conditions of the University. We can take as an example aluminum, which has given the best results from these studies. By the method of increasing the mechanical and physical properties of aluminum alloys, materials with modern resource-saving and environmentally friendly and decorative technology are created, which improve the strength and durability of aluminum alloy. Aluminum is distinguished from other metals by its corrosion resistance, gilding compactness, lightness and ease of processing. Alternatively, the most abundant metal on Earth is aluminum, in terms of reserves it is the third largest of all elements after oxygen and Silicon.

1-graph



1-chart. In the hardness of the modifiers added to the casting the difference is in the graphic image.

Conclusion And Discussion.

When we measured the hardness of the selected modifiers, it was reflected that magnesium dolomite and aluminum have the highest hardness.

In addition, it was found that copper and ferrocilium also have higher performance compared to other modifiers.

On the basis of the implementation of various temperature liquefaction modes of steel alloys of the 110g13l brand in electric arc and induction furnaces, a technology for obtaining bulk products with surface purity and high mechanical properties was created.

At different temperatures, it was processed into a liquid alloy inside the furnace and outside the furnace, and based on the results, a graph of the dependence of mechanical properties was developed.

Based on the liquefaction mode and processing technologies using flues, the processing mode and casting technology were created based on the dynamics of change in the gas and mirrors additives in the alloy.

Conclusion.

1. Based on the above exponential results, the following recommendations were developed as a result of theoretical and practical research on the topic of development of resistant parts of steel of the modified 110g13l brand:
2. Optimal modifiers have been developed for the development of refractory parts of steel of the 110g13l brand.
3. The general properties of the selected optimal modifiers were studied.
4. Based on the implementation of various temperature liquefaction modes of 110g13l alloys, bulk products with surface purity and high mechanical properties were obtained.

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