



TECHNOLOGY OF COATING THE GEARBOX BODY WITH ADC12 ALUMINUM ALLOY

Makhbuba Abdurakhimova, Malokhat Tukhtasheva,
Bobur Saparov, Rakhimov Murodullo
Tashkent institute of chemical technology

Abstract. In this thesis, the technology of coating the gearbox housing using ADC12 aluminum alloy in order to improve the operational properties of the surface is considered. The gearbox housing is exposed to mechanical loads, friction, vibration and temperature effects during operation. Therefore, it is important to increase the strength, wear resistance and thermal stability of the housing surface. The study analyzed the technological sequence of the stages of initial surface preparation, melting of the ADC12 alloy, coating formation and cooling. The quality of the coating can be assessed by such indicators as its thickness, degree of adhesion to the surface, porosity and microstructural state. The Al-Si-based composition of the ADC12 alloy is considered a promising material for increasing the hardness and wear resistance of the coating layer.

Key words: reducer housing, ADC12, aluminum alloy, surface coating, technological process, hardness, wear resistance, microstructure.

Introduction

Machine and of mechanisms Long- term and reliable operation largely depends on the structural and operational characteristics of their housing parts. The gearbox housing serves to accommodate bearings, gears and other mechanical elements and protect them from the effects of the external environment. During operation, mechanical stresses, vibrations and temperature changes occur on the surfaces of the housing.

The surface modern coating Modification using technologies allows you to improve the functional properties of the surface layer of the part while maintaining the properties of the main material. In this regard, the use of ADC12 aluminum alloy is one of the promising areas for improving the mechanical and tribological properties of the surface of the reducer housing.

Research methodology

Reducer The process of coating the body with ADC12 alloy consists of several main steps:

1. Surface preparation. The surface of the body to be coated is smoothed by mechanical processing. The surface is cleaned of oil, dust, oxide layer and other



contaminants. Good surface preparation serves to improve adhesion between the coating and the base material.

2. Preparation of ADC12 alloy. ADC12 alloy is melted according to a specified technological regime. During the melting process, a stable temperature and uniformity of the alloy composition are ensured.

3. Coating. The prepared ADC12 solution is applied to the pre-prepared surface of the gearbox housing. At this stage, the coating thickness and uniform distribution over the surface are controlled.

4. Cooling. After the coating is formed, the part is cooled under controlled conditions. The cooling rate can affect the microstructure, internal stresses, and mechanical properties of the coating.

5. Final mechanical treatment. If necessary, the coated surface is mechanically treated to ensure the required geometric dimensions and surface roughness.

Coating quality assessment

ADC12 coating efficiency It is recommended to study the following indicators to determine:

Indicator	Evaluation method
Coating thickness	Micrometer/metallographic analysis
Surface hardness	Vickers or Rockwell method
Microstructure	Optical microscope/SEM
Adhesion	Resistance of the surface layer to separation
Eating	Tribological testing
Surface roughness	Profilometer
Phase composition	XRD analysis

Coating thickness and The correct selection of technological parameters determines not only the mechanical strength of the coating, but also the quality of its adhesion to the surface of the gearbox housing. In particular, the condition of the boundary layer between the coating and the base material is important for the operational reliability of the part.

Conclusion

Reducer The technology of coating the body with ADC12 aluminum alloy is one of the promising methods that allows improving the functional properties of the surface



of the part. The main stages of the technological process are surface preparation, melting of the ADC12 alloy, coating formation, cooling and final mechanical treatment.

Coating to the quality coating Parameters such as thickness , melt temperature, initial surface condition, coating formation rate, and cooling conditions affect it . By optimizing these parameters, it is possible to increase the hardness, wear resistance, and operational stability of the gear housing surface. In further studies, it is desirable to experimentally determine the microstructure, hardness, and tribological properties of the ADC12 coating and determine the optimal technological regimes using mathematical and statistical methods.

Used literature

1. Jorstad J., Apelian D. *Aluminum Castings: Engineering Guide* . North American Die Casting Association.
2. ASM International. *ASM Handbook, Volume 15: Casting* . ASM International.

