ISSN: 2350-0328
International Journal of Advanced Research in Science, Engineering and Technology
Vol. 7, Issue 10 , October 2020

The Use of Lubricant Compositions Made on the Basis of Local Raw Materials in The Processing of Electrode Wire

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ABSTRACT. Dry lubricant obtained on the basis of local cheese is used for processing and drawing metals prepared from the following components: sodium soap, natriysulphate Na_2SO_4 5,0-20,0; bura $Na_2B_4O_7$ $10H_2O$ 0,1-5,0 and talc. At present, the pilot-test work was carried out at a private company "Davr Metal" in Namangan.

KEYWORDS: borax $Na_2B_4O_7$, sodium sulfate Na_2SO_4 5,0-20,0, sodium tripolyphosphate $Na_5P_3O_{10}$, sodium carbonate Na_2CO_3 modification, stearic acid, calcium stearate, magnesium MgO.

I.INTRODUCTION

The number of industries related to metal processing is growing in the country today. An example of this is enterprises producing metal wires of different diameters. These products are used in radio and electrical engineering, construction, chemical industry and many other sectors of the economy.

Such dry surkov compositions are not produced in Uzbekistan and are therefore imported from China, Russia and Ukraine for around $ 6/kg. As a result of the implementation of this technology and the launch of production, a new type of product will be produced on the basis of local raw materials. This, in turn, leads to the production of import-substituting products and savings in foreign exchange reserves. In addition, the cost of the planned product is about $ 1/kg, and 86% of the raw materials are available in the country

II. SIGNIFICANCE OF THE SYSTEM

Dry lubricant obtained on the basis of local cheese is used for processing and drawing metals prepared from the following components. The study of literature survey is presented in section III, methodology is explained in section IV, section V covers the experimental results of the study, and section VI discusses the future study and conclusion.

III. METHODOLOGY

The research was conducted in a laboratory. Na li soap is crushed and dried at room temperature. Based on the calculations, borax, talc and sodium sulphate were mixed using a reactor at 170-180 ° C and a composite was prepared. All substances were measured with high accuracy on an electronic analytical balance.

IV. EXPERIMENTAL RESULTS

Dry stretching processes are often used to obtain steel wires. Surkov materials for dry stretching are mainly surkov soap or surkov powder. Under these conditions, the surkov process is carried out in a surkov box, which is mounted on the front of the stretching equipment.

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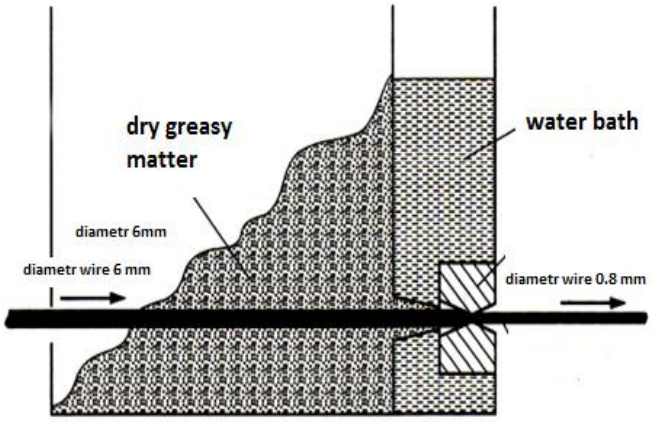
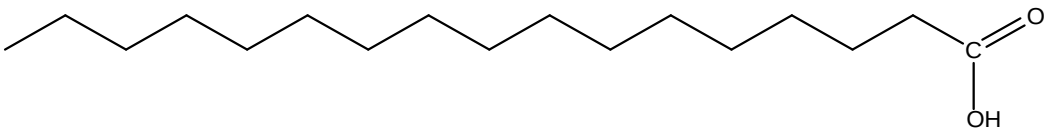


Figure 1. Dry wire extension device

The degree of grinding of the surkov material depends on the type of wire to be removed, ie the required amount of surkov powder must fall regularly in the elongation hole. During the dry stretching process, the wire is not cooled with oil as in other methods. Therefore, the appliance is equipped with a separate special cooling unit (eg water cooler).

In particular, dry surkov oils with the following composition have been developed for elongation of welding wires, eg%: five molecules of aqueous boron (pentahydrate) $Na_2B_4O_7$ $5H_2O$ – 60,0-90,0; sodium tripolyphosphate $Na_5P_3O_{10}$ – 8,0-12,0; trinatriiphosphate Na_3PO_4 – 8,0-12,0; sodium sulphate Na_2SO_4 – 13,0-35,0; sodium carbonate Na_2CO_3 - 3.0-11.2; bone glue (mezdrli, wood) - 0.01-1.0; the rest is water (Patent RU 2197560, S23S 22/00, V21S 9/00, opubl. 2003.01.27). The disadvantage of this composite is that it is expensive, requires the use of soap for additional lubrication, and can not be used in the manufacture of wire from mechanically cleaned rods. There is a dry surkov composite used to stretch wires, e.g.%: calcined soda Na_2CO_3 5.0-20.0; sodium nitrite $NaNO_2$ 0,5-7,0; sodium sulphate Na_2SO_4 5,0-20,0; bura $Na_2B_4O_7$ $10H_2O$ 0,1-5,0; magnesium (activated) MgO 1,0-5,0; boron nitride BN 0,05-3,0; the rest of the costearic acid $C_{17}H_{35}COOH$ - o (Patent RU 2190693, S23S 22/00, V21S 9/02, opubl. 2002.10.10). The disadvantage of this well-known dry surkov composite is that it can only be applied by phosphating and cannot be used in the process of stretching wires after mechanical cleaning of rods from okalin.

As a result of the introduction of the proposed technology, new products for the metalworking industry will be produced. As a result, the economic performance of the manufacturing enterprise grows. In the steel wire industry, wires with a larger diameter are made by stretching a larger diameter steel wire. Stearic acid is a saturated monobasic fatty acid with the following S3- (S2) 16-COOH ($C_{17}H_{35}COOH$) content.



Stearic acid is mainly obtained by hydrolysis of fats in industry. Stearic acid is oily, solid at room temperature.

We hydrolyzed the stearic acid in the laboratory under soapy acidic conditions. The stearic acid rises to the surface of the solution and is removed with a filter paper. The resulting acid is dehydrated in a drying oven without reaching the melting point.

The resulting stearic acid was extracted and dried again. It was found that its water content is 28%. When we melted, re-solidified and weighed at temperatures above 100 °C, we found that the mass was reduced by 5%. It can be seen that the stearic acid obtained contains 28 + 5 = 33% moisture.

Calcium stearate synthesis: 32 grams of stearic acid obtained from the above experiment, the mass of calcium hydroxide needed to convert this acid to calcium stearate is determined by the reaction equation.

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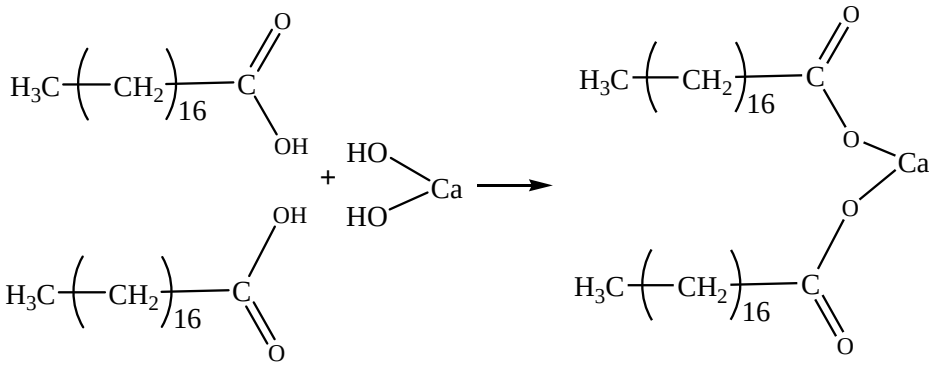

As a precaution, the heated saturated fatty acid was sprinkled with alkali and stirred vigorously. The resulting calcium soap, due to its higher melting point than fatty acids, solidifies and begins to separate. As the container is tilted, the calcium stearate is collected on top of the container and the alkali is added to the liquid fatty acid at the bottom. The process continues in this way.

When the process is complete, the calcium soap is collected and weighed.

Soap is one of the most common types of dry wire composites used to stretch steel wires. All dry surkov composites proposed in this study include household soaps containing 65-70% fatty acids. When the calcium stearate was completely dissolved, soap powder was added and completely dissolved. The remaining additions were then gradually systematized and intensified. In this case, the additional components must be mixed with a completely oily liquid to form a homogeneous system. The experiments were performed on an average temperature range of 150–170 °C and lasted for 1 h 13 min. All additives, such as talc and sodium sulphate, were added to the system and stirred vigorously until the liquid mass became a homogeneous system.

At the end of the work, the resulting product was cooled. Then it begins to solidify in a monolith. The resulting monolithic product was ground in a porcelain mortar and pulverized.

For the experiment, a total of 25 g of products were obtained in different compositions, and the mass of the obtained powder surkov composite was 22,9 g. The resulting powdery mass is a ready-made surkov composite, which can be initially tested. The most important parameter of Surkov composite is its adhesion to the surface of steel wire.

Table 1

To prepare 25 grams of dry surkov composite the mass of reagents required

Raw materials	Percentage by mass	The resulting mass
Calcium stearate	30	7,5
Soap	2	0,5
Tal'k	30	7,5
Lime powder	30	7,5
Potassium fluoride	8	2

The following percentages of the quantitative composition of the substances relative to the mass and the mass of reagents required for the preparation of 25 g of dry surkov composite are given in Table 1 below.

Soap, talc, borax, calcium stearate, sodium sulfate, zinc oxide, iron (III) oxide, potassium fluoride, and lime were used to make the dry surkov composites used to stretch the various steel wires recommended in this paper.

These substances are among the least scarce raw materials in the country. The process of making Surkov composite is similar to dissolving the above minerals in a soap solution.

The soap was melted by heat, and the other substances were added one after the other, stirring vigorously until a homogeneous system was formed.

If a large amount of the substance is suddenly released into the soapy liquid during this process, the mixture reacts and solidifies into a rubbery mass. This is because mineral additives with low liquefaction temperatures harden the soap and therefore form a hard alloy with it.

It is necessary to raise the temperature slightly to melt the alloy. Due to the addition of minerals, the melting point of the mixture is very different from that of soap. If this temperature is applied to the system, the soap may burn and lose its properties.

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 10 , October 2020

In addition, as the temperature rises, other substances in addition to the soap may decompose or additional chemical processes may occur, resulting in structural changes in the surkov composite and deterioration of its properties.

V. CONCLUSION AND FUTURE WORK

The proposed method for obtaining dry surkov composites, used for stretching steel wires, was found to be effective in household soap containing 65-70% fatty acids. This result can be achieved by supplementing the calcium stearate and adding the required reagents little by little and mixing it vigorously, as well as by keeping the temperature in the reactor at 150-170 °C for 2 hours to form a homogeneous system.

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