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SKN-40 RUBBER WITH THE PARTICIPATION OF SIMPLE AND COMPLEX ETERNALS PURCHASE OF CHEMICALLY RESISTANT RUBBERS

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Abstract:
A number of plasticizers were used to plasticize SKN-40 rubber. However, these plasticizers do not fully ensure the even distribution and adaptation of the ingredients used in the rubber mixture based on SKN-40 rubber, the purpose of which is to synthesize a new plasticizer and eliminate its shortcomings.
Selecting the vulcanization mode for the obtained composition systems, I vulcanized them at a temperature of 155^0C for 20 minutes.
I determined the physical and mechanical properties of the vulcanizate.
Vodka and sealants in pre-prepared press molds were obtained at Balakhani Rubber Technical Products Plant with the optimally selected recipe and vulcanization mode based on SKN-40 rubber. In order to determine the oil and gasoline resistance of these rubber products, samples prepared from them were studied in oil, transformer oil, NaOH solution, HCl acid, and benzyl alcohol for 1-8 months. The results showed that these rubbers not only meet the requirements of the standard but also surpass them in some respects. Taking all this into account, we have proposed to use our oil-and-gasoline-resistant products in equipment used in the oil and gas refining industry.
The kinetics of the vulcanization process of a rubber mixture based on butadiene-nitrile rubber was found. The vulcanization mode is defined as follows: T = 155^0C, P = 5MPa, t = 20 minutes.
The physical and mechanical properties of vulcanizate were studied and it was shown that the indicators of the obtained product meet the requirements of the standard.
The durability of the obtained rubbers in aggressive environments (oil, oil, alcohol, acid, alkali) was studied from 1 to 8 months.

Keywords
Butadiene-nitrile rubber, rubber compound, vulcanization kinetics,. physical and mechanical properties of vulcanization aggressive environment, plasticizer, modification. chemical resistance, alloy flow rate.

Introduction

The object of research: Different plasticizers are used in the preparation of rubber compositions according to different recipes: fuel oil, rosin, rubrics, synthetic fatty acids, dactyl phthalate, deputy phthalate, naphthenic acids, and their simple and complex esters, etc. The main purpose of adding a plasticizer to the rubber mixture is to modify the physical and mechanical properties of the rubber mixture.

Purpose and nature of the research: A number of plasticizers were used to plasticize SKN-40 rubber. However, these plasticizers do not fully ensure the even distribution and adaptation of the ingredients

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used in the rubber mixture based on SKN-40 rubber, the purpose of which is to synthesize a new plasticizer and eliminate its shortcomings.

The aim of the work is to adapt SKN-40 rubber to other ingredients, mix quickly and improve the physical and mechanical properties of the vulcanizate. For this purpose, based on standard indicators, it is necessary to prepare a rubber mixture based on comparative dactyl phthalate, deputy phthalate, and their combination and to study its physical and mechanical properties by vulcanizing it. In the laboratory, the synthesis of diphenyl propane acrylate and diphenylolpropane oxypropylene esters is used as a plasticizer in SKN-40 rubber. Using this new plasticizer synthesized is to obtain rubber resistant to aggressive environments. The following issues have been resolved to achieve the set goal:

- preparation of polymer compositions using new types of plasticizers;

- the study of technological compatibility of the polymer-plasticizer system, the study of the interfacial field, structure, and properties of polymer composition;

- the study of rheological properties of the polymer composition depending on the type of polymer base and plasticizer;

- the study of physical and mechanical properties of the polymer composition depending on the ratio of the components of the mixture;

- Research of technological mode of processing of plasticized polymer composition by vulcanization method;

-development of recommendations on possible perspective directions of application of the studied polymer composition;

The scientific novelty of the work: For the first time in the polymer composition based on SKN-40 rubber, diphenyl propane acrylate and diphenylolpropane oxypropylene esters were used as plasticizers. The results confirmed the use of this plasticizer to produce rubber that meets the requirements and can work in aggressive environments.

Practical significance: Butadiene-nitrile rubber-based oil-gasoline-resistant rubbers are widely used as sealants and vodka in the oil and gas industry. For this purpose, we have developed a special recipe for rubber-based on SKN-40 and plasticizer and purchased vodka and sealants at the Balakhani Rubber-Technical Products Plant. Samples of these sealants and vodkas obtained were tested for chemical resistance in aggressive environments - oil, fat, alkali, acid, and alcohol for 1-8 months. After 8 months, it became clear that the tires we bought fully meet the standards and are superior to some of them. That is why we recommend their application in the oil and gas industry

Experiment.

RESULTS OF RESEARCH FOR THE PRODUCTION OF CHEMICALLY RUSSIAN RUBLES

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Polyvinyl chloride was modified with butadiene-nitrile rubber in various proportions at a temperature of 125-135^{0}C for 3-4 minutes. Modification Composite material was prepared on the basis of PVC / SKN / dolomite / DOF-100/20/10/10 ratio and the physical and mechanical properties of the obtained composition mixture were studied. It was determined that the resulting composition meets the requirements of the advanced standards and harsh operating conditions. For this purpose, it is proposed to use the purchased composite material as a sealant for plastic windows (vodka), lambrequin, as well as in the production of linoleum.

It is known that the flow rate of PVC-based composite alloy (AAG) is one of the main indicators taken to accurately assess the processing technology of PVC-based compositions.

We studied the rheological properties of PVC / SKN-40 mixture to study the changes that may occur during processing and mechanical mixing of PVC / SKN-18 synthesis. In the study, the temperature of the mixture PVC / SKN-18 in the IIRT-5 device (capillary viscometer), the flow parameters of the mixture under the influence of different loads, the volume dependence of the flow rate (Q), the voltage dependence of the flow rate, the effective viscosity, and displacement voltage. has been identified.

It is noted in Table 1 by studying the time taken by the indicator scorpion S = 20 mm distance of PVC / SKN-40 binary mixture under the influence of different loads on the IIRT-5 capillary viscometer at 170-175^{0}C.

. The time is taken for the indicator scorpion of PVC / SKN-40 binary mixture to cover the distance S = 20 mm is shown in Table 1.

Table 1. How long the distance of S = 20 mm of the indicator needle of PVC / SKN-40 binary mixture has passed.

	Alloy flow rate			
№	13,06	19,12	24,56	32,08
1	68"04"	49"09"	31"75"	17"63"
2	38"73"	18"24"	11"808"	8"36"
3	29"18"	15"25"	10"90"	6"96"
4	17"32"	13"93"	8"30"	6"08"
5	9"22"	7"05"	4"45"	3"08"

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170^{0}C - the average value of the velocity of displacement during the capillary movement of samples corresponding to each of the displacement voltages in the temperature mode is calculated by the following formula: $\gamma = \frac{Q}{\pi \cdot r^3}$

The results are given in Table 2

Table 2

Dependence of displacement velocity (γ) on displacement voltage

№	τ_1, san^{-1}	τ_2, sec^{-1}	τ_3, sec^{1}	τ_4, sec^{-1}
$\overline{\gamma_1}$	0,535	0,7898	1,1465	2,0648
$\overline{\gamma_2}$	0,93995	1,9958	3,0829	4,3543
$\overline{\gamma_3}$	1,2476	2,3871	3,3378	5,2302
$\overline{\gamma_4}$	2,1019	2,6132	4,3826	5,9873
$\overline{\gamma_5}$	3,9484	5,1634	8,1803	11,8190
$\overline{\gamma_6}$	5,1711	7,9136	11,2353	16,4717
$\overline{\gamma_7}$	7,0009	10,7382	15,1677	23,0395

3.4 Determination of the degree of swelling of a rubber sample

After the rubber mixture was prepared, volcanicates were prepared in different mass ratios by selecting the appropriate vulcanization regime. Samples of vulcanizates were weighed on an analytical balance cut under laboratory conditions, and then the resistance of the rubber product to aggressive environments was studied by selecting the appropriate solvent. For this purpose, the swelling process of the rubber samples obtained on the basis of ethers in different media was studied and the corresponding swelling curves were constructed. We conducted the study in 5 solvent media: crude oil, transformer oil, NaOH (10%), HCl, benzyl alcohol. The swelling rate ranged from 1 to 8 months.

Swelling of the sample in oil: Swelling in transformer oil:

〖A〗 _1 = (2,2-2) / 2 = 0,1 α_1 = (2,4-2) / 2 = 0,2

〖A〗 _ (2) = (2,36-2) / 2 = 0,18 α_2 = (2,92-2) / 2 = 0,46

α_3 = (3,0-2) / 2 = 0,5 〖α〗 _3 = (3,4-2) / 2 = 0,7

〖A〗 _ (4) = (4,48-2) / 2 = 1,24 α_4 = (4,7-2) / 2 = 1,35

α_5 = (5-2) / 2 = 1,5 〖α〗 _5 = (5,2-2) / 2 = 1,6

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Swelling of the sample in hydrochloric acid:

α _1 = (2,3-2) / 2 = 0,15

α _2 = (2.46-2) / 2 = 0.23

α _3 = (3.2-2) / 2 = 0.6

α _4 = (4,2-2) / 2 = 1,1

α _1 = (4.84-2) / 2 = 1.42

I selected the vulcanization mode for the obtained composition systems and vulcanized them at 1600C for 20 minutes.

I determined the physical and mechanical properties of the vulcanizate.

Vodka and sealants in pre-prepared press molds were obtained at Balakhani Rubber Technical Products Plant with the optimally selected recipe and vulcanization mode based on SKN-40 rubber. In order to determine the oil and gasoline resistance of these rubber products, samples prepared from them were studied in oil, transformer oil, NaOH solution, HCl acid, and benzyl alcohol for 1-8 months. The results showed that these rubbers not only meet the requirements of the standard but also surpass them in some respects. Taking all this into account, we have proposed to use our oil-and-gasoline-resistant products in equipment used in the oil and gas refining industry.

The alkali of rubber samples. Alcohol and gasoline leaks were determined and the results obtained are shown in Figures 1 and 2

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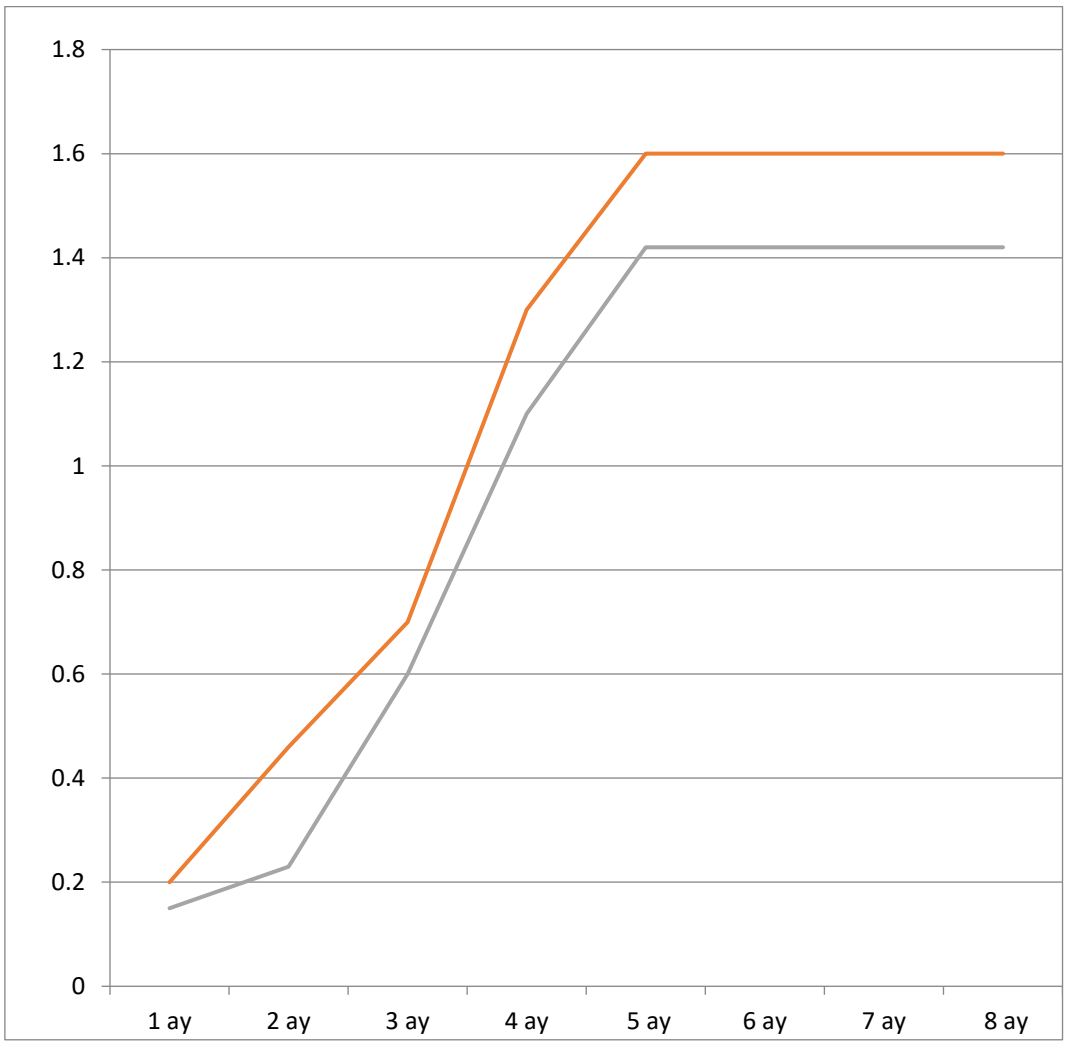

Figures 1 Swelling of the sample in gasoline and oil(gasoline oil)

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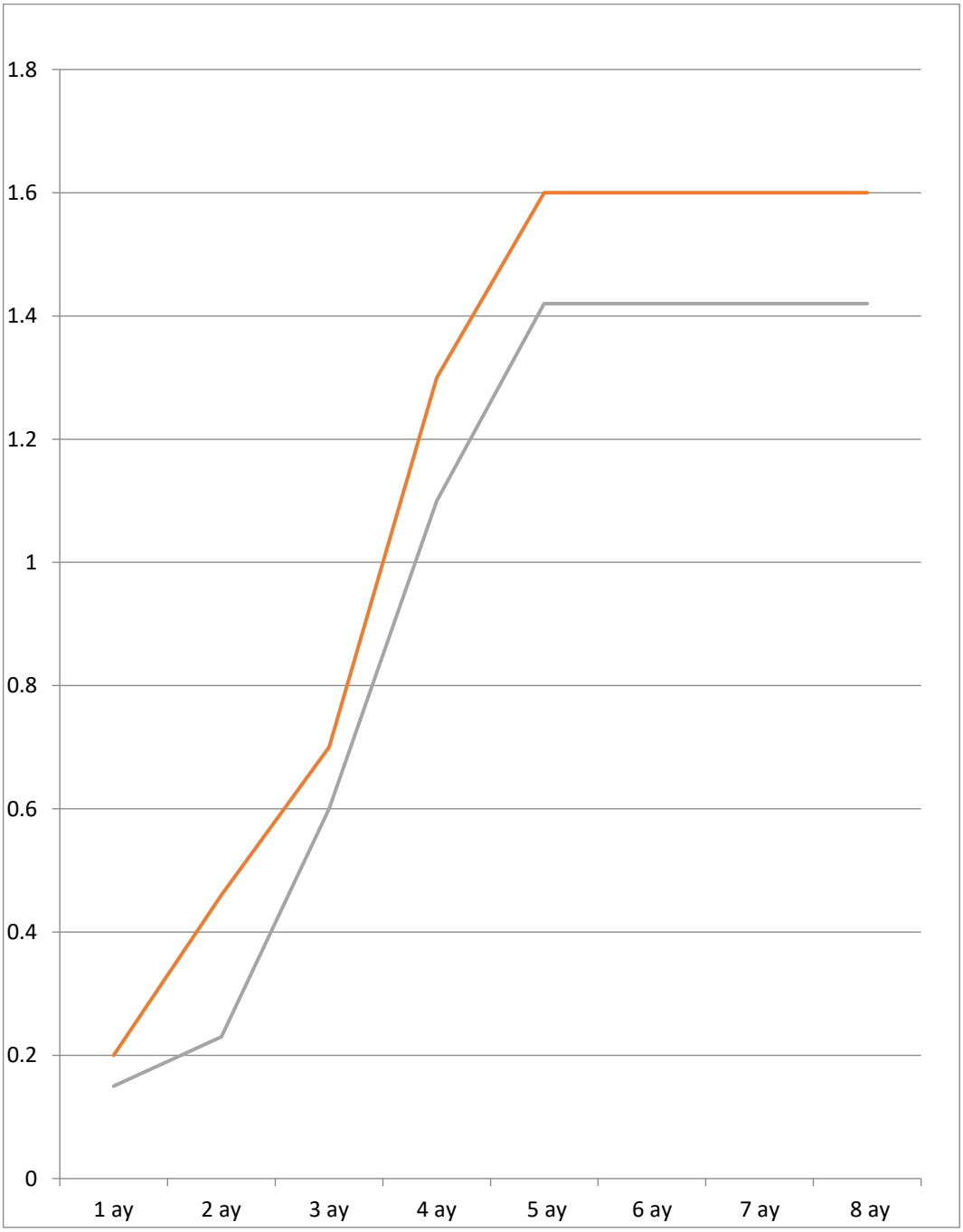

Figures 2. Swelling graph of the sample in alcohol and alkaline medium

Swelling of the sample in alkali

$$\alpha_1 = \frac{2{,}32-2}{2} = 0{,}16$$

$$\alpha_2 = \frac{2{,}6-2}{2} = 0{,}3$$

Swelling of the sample in alcohol :

$$\alpha_1 = \frac{2{,}7-2}{2} = 0{,}35$$

$$\alpha_2 = \frac{3{,}44-2}{2} = 0{,}72$$

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$$\alpha_3 = \frac{3{,}3-2}{2} = 0{,}65 \qquad \alpha_3 = \frac{4{,}28-2}{2} = 1{,}14$$

$$\alpha_4 = \frac{3{,}8-2}{2} = 0{,}9 \qquad \alpha_4 = \frac{5{,}04-2}{2} = 1{,}52$$

$$\alpha_5 = \frac{4{,}64-2}{2} = 1{,}32 \qquad \alpha_5 = \frac{5{,}6-2}{2} = 1{,}8$$

. **Results:**

2. The kinetics of the vulcanization process of a rubber mixture based on butadiene-nitrile rubber were found. The vulcanization mode is defined as follows: T = 1550C, P = 5MPa, t = 20 minutes.

3. The physical and mechanical properties of vulcanizate were studied and it was shown that the indicators of the obtained product meet the requirements of the standard.

4. The durability of the obtained rubbers in aggressive environments (oil, oil, alcohol, acid, alkali) was studied from 1 to 8 months.

5. For the first time we used diphenylolpropane caprylate and oxypropylene esters as plasticizers, and the results allow us to use these plasticizers in the future in the production of oil and gasoline resistant rubber.

6. Swelling of the proposed tires in motor oil at a temperature of 700C has been studied. Swelling at operating temperature for 72 hours was only 0.01%. Therefore, the proposed product is fully responsive to swelling in aggressive environments.

7. The main part and application of the research was carried out in "Baku Rubber Products" OJSC and an act was obtained

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