

## PVC COMPOSITIONS WITH HIGH PHYSICAL AND MECHANICAL PROPERTIES

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The successful development of polymer packaging materials for long-term storage of food is due to the efficiency of polymers, and their production is relatively inexpensive and practical. Polymeric packaging materials allow to protect products from external influences due to a number of their valuable consumer properties – high strength, elasticity, chemical resistance, the possibility of welding and bonding, low moisture and gas permeability [1, 2].

Developed polymer compositions based on PVC with high physical and mechanical properties: composition №1 (parts by weight) – polyvinyl chloride – 100; dioctyl phthalate – 55; epoxidized vegetable oil – 5; calcium stearate – 0.8; zinc stearate – 0.2; stabilizer-antioxidant – 4-methyl-2,6-di-tert-butylphenol – 0.04; compositions №2 (parts by weight): polyvinyl chloride – 100; dioctyl sebacinate – 40; epoxidized vegetable oil – 2.5; calcium stearate – 0.6; zinc stearate – 0.4; stabilizer-antioxidant – 4-methyl-2,6-isobornylphenol – 0.05.

Some properties of polymeric PVC compositions which are given in tab. 1.

Table 1. Properties of the studied PVC compositions

Characteristic	Standards according to GOSTs	Compositions with various stabilizers	
		Composition №1	Composition №2
Density, g / cm <sup>3</sup>	1,4	1,38	1,38
Softening temperature, °C	170	172	170
The brittleness temperature, °C	minus 40	minus 35	minus 55
Water absorption,%	0,08	0,08	0,05
Relative elongation at break,%	200	225	250
Tensile strength, MPa	14,5	16,6	18,5

The table shows that the value of the relative elongation at break increased in the composition №2 to 250 % compared to composition №1, and the value of tensile strength increased in the composition №2 from 16.6 MPa to 18.5 MPa. Water absorption in composition №2 was 0.05 %, down 0.03 % compared to composition №1. The brittleness temperature in composition №2 was minus 55 °C compared to composition №1, in which the brittleness temperature is minus 35 °C, ie water absorption decreased by 35 %.

The data in the table show that the plasticizer DOS in comparison with DOF provides higher performance of PVC composition №2. The greatest preservation of the elasticity of PVC compositions among the tested plasticizers is observed for the sample plasticized DOS. PVC composition containing DOS, more resistant to moisture, shows high elongation at break and tensile strength.

## Literature

1. Ханчич, О.А. Экспресс-метод исследования упаковочных полимерных пленок / О.А. Ханчич, В.Б. Ларионов, С.А. Кузнецова // Электронный журнал Cloud of Science. – 2013. – No. 3 – [Электронный ресурс]. – Режим доступа <http://cloudofscience.ru> 35.

2. Бристон, Дж.Х., Полимерные пленки. Пер. с англ. / Дж. Х. Бристон, Л.Л. Катан. – М.: Химия, 1993. – 381 с.