



**DEVELOPMENT OF OLIGOMERIC ANTIPYREN FOR POLYMERIC BUILDING
MATERIALS**

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Annotation

The article presents the result of the preparation of oligomeric flame retardants based on the products of the interaction of phosphorus -boron-containing compounds of the grades Aj-4,Aj-5, Aj-6 and also studied the fire retardant efficiency of treated wooden samples providing the 1st group of fire- retardant efficiency , according to GOST 16363-98

Keywords: Oligomeric flame retardant, flame retardant properties, flame retardant composition, flame retardant efficiency, flammability, self-burning, smoldering

New polyfunctional oligomeric fire retardants based on the products of interaction of phosphorus-boron-containing compounds have been synthesized, while the properties of fire retardants brands AJ-4, AJ-5 and AJ-6 have been studied.

The test procedure was carried out as follows: the test pieces of pine wood were suspended vertically in a black roofing steel pipe 166 mm long and 50 mm in diameter. A flame of a gas or alcohol burner was brought under the sample protruding from the pipe by 5 mm (in our tests, an alcohol burner was used). The distance from the upper edge of the burner to the sample was 10 mm. The holding time of the sample in the flame of a gas burner is 1 min, and in the flame of an alcohol burner, 1 min. 30 sec. After removing the burner, the duration of self-burning and smoldering of the sample was recorded.

This experiment was carried out in accordance with GOST 16363-98. The essence of the methods is to determine the loss of mass of wood treated with the test coatings or impregnating compositions, during a fire test under conditions favorable to heat accumulation. The classification method is used to determine the group of fire retardant efficiency and during certification tests. The accelerated test method is used to control the fire-retardant efficiency of fire-retardants that have passed classification tests.

The action of fire retardants is based on the fact that if there is a certain concentration of them in wood, they prevent it from burning without a source of flame. When exposed to fire on wood, various physicochemical processes take place, on which fire retardants have a fire retardant effect.

Fire retardant performance studies were carried out on wood elements. The composition was applied to the surface to be treated by spraying. The application was carried out in layers (2 layers). In one step, 500 g / m² of the composition was applied. The interval between treatments was at least 12 hours. According to theoretical calculations, 1000 g of such a composition was consumed per 1 m² of the



treated wood surface, excluding losses. The results of the study of the compositions of ADJ-4 showed that, on average, the weight loss of the sample was 8.0%, that is, the fire retardant composition provides the 1st group of fire retardant efficiency, according to GOST 16363-98 (Table 1). The results of the study of the compositions of AJ-5 showed that, on average, the weight loss of the sample was 6.5%, that is, the fire retardant composition provides the 1st group of fire retardant efficiency, according to GOST 16363-98 (Table 1).

Table 1-Physicochemical parameters of the oligomeric fire retardant.

Indicators	Oligomeric flame retardant		
	АДЖ-4	АД-5	АДЖ-6
Solubility	water		
Appearance and color	Oligomeric substance of white color		
Flammability indicators: weight loss,% GOST 16363-98	8,0	6,5	7,5
Time of self-burning and smoldering, with GOST16363-98	Absent		

The results of the study of the compositions of ADJ-6 showed that, on average, the weight loss of the sample was 7.5%, that is, the fire retardant composition provides the I group of fire retardant efficiency, according to GOST 16363-98 (Table 1).

From the data of the impregnating compositions AJ-4, AJ-5, AJ-6 and from those given in Table 2, it can be seen that the oligomeric flame retardants belong to the I group of fire retardant efficiency. Solutions of oligomeric compositions penetrate deep into the surface, wetting the surface layer of wood. After evaporation of the carrier water, the fire retardant remains among the fibers, thereby creating a protective layer.

The fire-retardant efficiency of the compositions AJ-4, AJ-5, AJ-6 with a weight loss was 6.5-8.0%. Analysis of the ways of improving fire retardant impregnating compositions, their use in construction to increase the fire resistance of structures and wood products showed that the priority is the compositions that can provide the required parameters of fire protection at minimal cost, without reducing or deteriorating the operational properties of wood. Such a wide range of requirements for modern fire protection obliges researchers to constantly expand their scientific research.

Table 2- Influence of impregnation for fire protection of wood

Material name	Application technology	Consumption, kg / m ²	Fire retardant efficiency group
АДЖ-4	By brush, roller, spray	0,2	I
АДЖ-5		0,2	I
АДЖ-6		0,2	I



Thus, the analysis of the work performed shows the prospects for the development and use of composite materials of phosphorus-boron-containing oligomeric flame retardants as fire retardants for wood and cellulose, cotton products, etc.

Literature

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