

# **PROCEDURE FOR STUDYING THE PARAMETERS OF THE INSTALLATION WITH AN EXTENDED BARREL FOR EXTINGUISHING BY GEL-FORMING COMPOSITIONS**

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The optimum value of dispersion and intensity of gel-forming compositions (GFC) spraying was determined in comparative tests on extinguishing simulated fires 1A, which were characterized by the extinguishing capacity [1].

In the course of the previous experiments the size of drops was estimated visually, by exploring through a microscope the sample of the hydrophobic material (Teflon) with spraying the fire-extinguishing substance on its surface. To facilitate observations, the solutions were colored with a dye.

Preparation of the installation for operation involves filling the containers with aqueous solutions of GFC components through the upper pouring necks and air pumping into the high-pressure cylinder to achieve a pressure of 20 MPa.

Testing was carried out on the simulated fires 1A, which involved a stack of 72 wooden bars laid in 12 layers by 6 layers in each with the cross-section in the shape of a square with the side of 40 mm. To make simulated fires, we used a workpiece of ordinary pine wood with humidity within (10÷14) %. The stack was placed on a metal stand from steel corners of dimensions of 500×40×4 mm, at the distance from the floor surface of 400 mm. For ignition, the metal deco for fuel of the dimensions of 400×400×100 mm was placed under the stack. The deco was set horizontally, covered with a water layer of the thickness of 20 mm and then 1 liter of gasoline A-80 was poured into it. The tests were conducted at the velocity of wind around the simulated fire of (1÷2) m/s, at the air temperature of 19 °C, the temperature of water, fuel and water solutions of the components of the gel-forming composition of 18 °C.

To conduct the trials, aqueous solutions of gel-forming components, which by the weight content of dry substances corresponded to the optimized composition, were prepared in two separate measuring capacities

The prepared solutions were poured into the installation for extinguishing by gel-forming compositions. Then the simulated fire was started. After  $480 \pm 5$  s of free combustion, the gel-forming composition was fed from the windward side. To ensure the safety of a fire-fighter, extinguishing of the simulated fire was performed from the distance of 3–5 m by a continuous jet (Fig. 1). Intensity of spraying gel-forming compositions was regulated by changing the pressure in the installation.

The duration of fire suppression that was equal to the time interval from the beginning of feeding the solution to the end of combustion was recorded. The result was considered positive if extinguishing lasted up to 40 s and the flame did not appear 600 s after completion of extinguishing. The weight of the extinguishing substance, consumed for fire suppression, was determined by weighing the installation before the beginning the extinguishing and after it.



**Fig. 1. Extinguishing the simulation fire 1A by the installation with the extended barrel of the cranked type for extinguishing by gel-forming compositions**

#### **References:**

1. Ostapov K.M., Kirichenko I.K., Senchykhyn Y.M., Syrovyi V.V., Vorontsova D.V., Belikov A.S., Karasev A.G., Klymenko H.O., Rybalka E.A. (2019) Improvement of the installation with an extended barrel of cranked type used for fire extinguishing by gel-forming compositions. *Eastern-European Journal of Enterprise Technologies.* (100). P. 30–36. doi: 10.15587/1729-4061.2019.174592.