EUROPEAN JOURNAL OF LIFE SAFETY AND STABILITY (EJLSS)
ISSN2660-9630
www.ejlss.indexedresearch.org Volume 25, January-2023 ||

Intensive Cleaning Devices for Fire Hoses

N. Y. Makhkamov
Professor of the "Fire and Rescue Technics" department of the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan., technic sciences candidate, professor

E. V. Abdullaev
Teacher of the "Fire and Rescue Technics" department of the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan

Abstract: *Operational and intensive cleaning of various contaminants accumulated in the process of extinguishing fires from fire hoses is possible using a portable intensive wash. Proposed a new device developed by the faculty of the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan for cleaning the dirt of fire hoses of various hose sections (51, 66, 77).*

Keywords: *washing, intensive, water supply cut, water pressure.*

Date of Submission: 04-12-2022 ***Date of Acceptance: 05-01-2023***

After extinguishing a fire or after training of fire-rescue units, in sleeve posts, dirty sleeves must be cleaned of dirt. To do this, the bath is filled with water or detergent. The size of the metal bath should be 6 m x 1.5 m x 0.5 m. The edges of the bath are covered with materials with a lower coefficient of friction and at the bottom of the bath installed a garbage disposal device. After wetting the sleeve in the bath, they are transferred into the sleeve washing machine. The washing machine consists of a centrifugal disk or cylindrical brush and a liquid supply device.

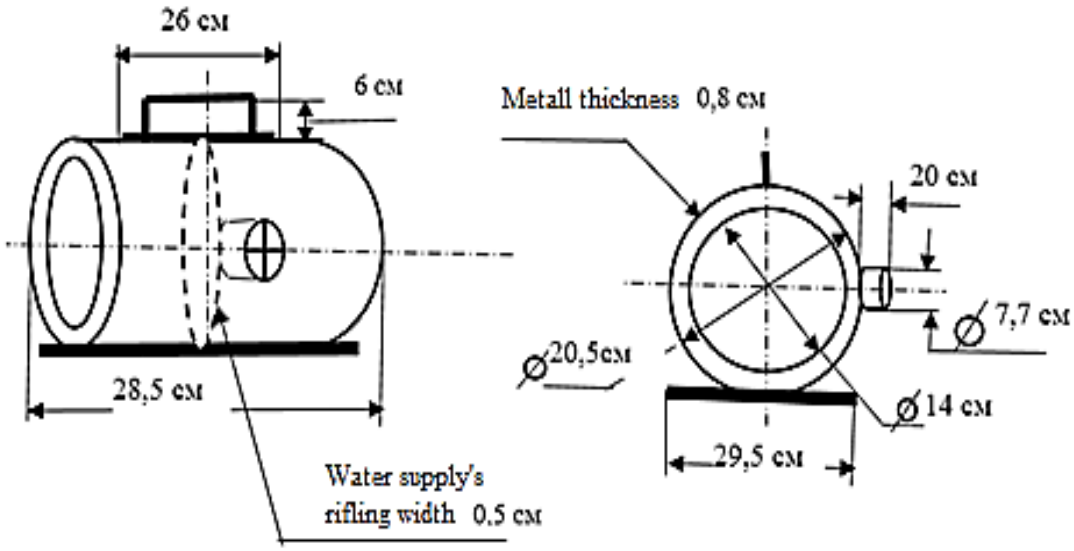
Operational and intensive cleaning of various contaminants accumulated in the process of extinguishing fires from fire hoses is possible using a portable intensive wash. Due to the small mass of the device, the use of compact and mobile device is possible directly at the fire extinguishing site.

This article describes a new device developed by the faculty of the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan for cleaning the dirt of fire hoses of various sections (51, 66, 77). Fire hoses after fire-rescue operations are heavily polluted, in order to bring them to their previous combat position, it is necessary to clean it under an intense stream of water. Cleaning fire hoses from dirt with water performs by portable device for washing fire hoses. This device is intended for quick and effective cleaning of the surface of the fire hose from various kinds of contaminants. The device is useful for cleaning the hose commonly used in fire-rescue units with 51, 66, 77 m diameter section and others (Pic. 2).

Intensive washing for fire hoses is convenient in use, it is possible to connect it to the water supply, fire engine and to other sources of water supply.

Overall dimensions of intensive washing device are: length - 28.5 cm, width - 29.5 cm, height - 27.5 cm. (Pic. 1)

The outer and inner parts of the washing device were made of metal with a thickness of 0.8 mm, treated with an anti-rust coating inside, and waterproof paint on the outside.



Pic.1. Basic dimensions of intensive washing device for fire hoses

In the gap between the inner and outer part with 6.5 cm thickness, water enters with high pressure depending on the water pressure. There are two side holes in the frame: outlet (left for transferring a dirty hose) and inlet (right for receiving a clean hose), for supplying fire hoses with spray rifling‘s 0.5 cm wide along the inside with a groove rifling of 45^0 to the left side.

Pic. 2. General view of the device for intensive washing of fire hoses.

Water supplied under pressure from 1.0 to 4.5 atm. from the outer head of the coupling, when a dirty sleeve is transferred from the left side, under the pressure of water, the sleeve itself is repelled and comes out clean from the right side. The device’s frame is equipped with a handle for easy carrying and an inlet hole with a coupling head (77). At the bottom there is a 0.8 cm thick solid metal prop for the stability of an intensive wash. In addition, in order to keep the intensive wash stable when water is supplied with high pressure, it is made with a 25 kg weight.

The calculation of water consumption, the time spent washing for one sleeve and the speed of cleaning are calculated according to known formulas [1,2].

The area of the water supply rifling inside the washing device according to the inner diameter is determined by the following formula:

$\omega = 2\pi r$, м^2 (1)

where π — is the ratio of the circumference to the diameter of the circle, π=3.14

$\omega = 2 * 3{,}14 * 7 = 43{,}96 = 0{,}0044$ м^2.

Water supply rate to devices [1]

$V = \sqrt{2\,gH}$ м/с (2),

Where g — is the free fall acceleration,

H - water pressure at the inlet to the washing device, m.

Water consumption is determined by the following formula:

$Q = V\ \omega$, (3).

The performed calculations showed the efficiency of the development work, the time for cleaning the dirt of the sleeve is reduced once or twice, so if manual cleaning using a bathtub and a washing machine takes 5-7 minutes, and with the developed intensive washing device it takes only 10 seconds.

The water consumption in manual cleaning using a bathtub and a washing machine is 2000 - 3000 l, and for intensive washing it is 130 l / s.

Thus, the developed device for cleaning and washing fire hoses quickly and effectively cleans the surface of the fire hose from various kinds of contaminants.

It is proposed to equip fire-rescue units with devices for washing fire hoses, which are included in the complement of fire and technical armament.

The teaching staff of the Academy of the Ministry of Emergency Situations of the Republic of Uzbekistan continues to improve the device for washing fire hoses with newer developments.

References:

1. А.А. Качалов, Ю.П. Воротынцев, А.В. Власов. Противопожарное водоснабжение. - М.: Стройиздат, 1985.
2. ShNQ 2.04.02-19 Suv ta’minoti. Tashqi tarmoqlar va inshootlar. Loyihalash normalari. Toshkent. 2019 y.