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## **Effect of radiation sterilization on air permeability and structure of HoloFiber® nonwoven fabric**

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### **Abstract**

At the moment, there is a wide range of bulky nonwovens for various purposes on the market. One of the important areas of using such materials is healthcare. In particular, bulky nonwovens are intended for the manufacture of wound dressings, evacuation kits for newborns. Disposable medical devices of this kind are usually subjected to radiation sterilization. As is known from earlier studies, radiation sterilization significantly affects the performance of nonwovens. In this regard, for nonwoven materials for medical use, an important characteristic is the stability of indicators after exposure to radiation sterilization.

The object of this study was a bulky nonwoven material of the HoloFiber® brand (manufactured by *OOO Termopol*). The breathability and structure of a 100 g/m<sup>2</sup> nonwoven fabric was examined. After exposure to ionizing radiation with an absorbed dose of 60 kGy, the air permeability of the material decreased by 6%, which, apparently, is associated with a change in the size of the pores, or rather, their stabilization in diameter. Despite the decrease in air permeability, the nonwoven material meets the requirements for medical products made of nonwoven materials, aimed at ensuring normal heat and gas exchange of the human body with the environment, in accordance with GOST 12.4.280 "Occupational Safety Standards System (SSBT). Special clothing for protection from general industrial pollution and mechanical stress. General technical requirements ". The study of the structure of the nonwoven fabric by the porosimetry method showed that due to radiation sterilization, the structure of the HoloFiber® nonwoven fabrics became more regular, the pores were reduced and became more homogeneous. A detailed study of the location and intermeshing of the fibers using a microscope allows us to note that the ionizing radiation did not lead to any visual changes.

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