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## **Study of the effect of pure and modified supercritical carbon dioxide on the properties of nonwovens for medical devices**

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### **Abstract**

The increase in the use of the nonwovens in the production of medical devices has indicated the problem of their sterilization more acutely. The shortcomings of the traditional sterilization methods impose the restrictions on their use in the processing of the devices made from the materials under discussion. This paper considers an alternative method of sterilization using the supercritical fluid media and their effect on the test material. The influence of pure and modified with hydrogen peroxide supercritical carbon dioxide on the strength and hygienic properties of nonwoven polypropylene materials was studied in order to determine the possibility of using the supercritical fluids as a sterilizing agent for medical devices made of polymer materials. The samples of the medical nonwoven were treated with a pure and modified with 1% hydrogen peroxide carbon dioxide at a temperature of 313 K and a pressure of 30 MPa for four hours. The values of breaking load of the untreated and treated with the pure and modified with 1% hydrogen peroxide supercritical carbon dioxide samples of nonwoven of the following brands: *SS premium*, *SS comfort* and *SMS comfort* were obtained. The values of air permeability of the untreated and treated with pure and modified with 1% hydrogen peroxide carbon dioxide samples of nonwoven of brands *SS-20* and *SS-25* were obtained. The obtained results on the change in the breaking load, elongation at break and air permeability between the test and processed samples are correlated with the values of the relative error of the corresponding measurements. The possibility of using the supercritical carbon dioxide modified with 1% hydrogen peroxide with the above thermodynamic parameters as a sterilizer of the nonwovens of the brands tested in this work is established.

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