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Study of the effect of radiation sterilization on the properties of polypropylene for injection molded medical products

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Abstract

As you know, laboratory-diagnostic glassware used in medicine is mainly made of polyethylene and polypropylene, transparent polystyrene and other polymers with the properties necessary for use in laboratory conditions. The advantages of plastic laboratory glassware are obvious: products made of it are lightweight, durable, besides, they do not react with urine of any acidity level and have no impurities. The presence of the label allows you to write the necessary data about the patient, which is also provided for by the instructions for sending the material to the laboratory. It is important for manufacturers that after sterilization the physical and mechanical indicators remain at a high level, and also the change in the color of the product turns out to be of no small importance. In the work, injection molded polypropylene grades were studied, which can be used as a material for laboratory-diagnostic glassware: Balen 01270, manufactured by *JSC Ufaorgsintez*, (PP 01270); Balen 1030, manufactured by *JSC Ufaorgsintez*, (PP 1030); H 250 GP / 3, produced by *LLC Tobolsk-Polymer, Sibur Holding,* (PP H 250 GP / 3); H 250, *LLP "Company Neftekhim LTD"*, (PP 250). It was found that the greatest increase in MFI is observed for polypropylene of the Balen 1030 grade, increasing by 27.5 times. The smallest increase in MFI is observed for grades H 250 GP/3 and H 250 by 1.5-1.7 times. With an increase in the absorbed dose, the viscosity naturally increases due to the destruction of PP. The color practically does not change with an increase in the radiation dose. For PP H250. Recommended for manufacturers of medical devices PP H 250 grade polypropylene.

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