



## Image Analysis for Testing and Evaluation of the Barrier Effect of Surgical Gowns

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### ABSTRACT

*Clothing is used for protection against particle loaded liquids in many working environments. An important field is the operating theatre, where surgical gowns need to serve as a barrier between the infection source and clinical personnel as well as providing satisfactory wearing comfort. The micro-organisms, like bacteria and viruses, which are responsible for the transmission of disease are of various sizes and geometries. Comfort is important for the healthcare providers who often have to wear their surgical gown for several hours while doing strenuous work under hot lamps.*

*Principally, woven fabrics, laminates and nonwovens can be used. Membranes and coatings tend to impair the wearing comfort. Hydrophobic polyester woven fabrics are currently the only reusable material for surgical gowns which are able to fulfill these two contrary demands at the same time. They are used for short surgical operations with a small amount of liquid. Even though there are many different fabric structures on the market, until recently, their pore structure combined with their barrier performance have not been investigated at a basic level. This paper reports some of our on-going research work and results on this topic /1-5/.*

*Keywords: surgical fabric, nonwovens, wovens, laminates*

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### Aims

Previous research has focused on the evaluation of the practical barrier function of the textile and the level of comfort for the wearer. But the reasons that explain the results have generally not been examined. It is necessary to know the influences of the fabric's constructional parameters, such as the fineness and cross-sectional shape of the filaments, the linear density of the filament yarns, the type of weave and the fabric density (or woven fabric count), on the pore structure within the fabric. The objective of the present study was to examine the pore structure of commercially available woven fabrics with different constructions by

viewing the fabric cross-sections. These examinations were aimed at assessing the effect of the fabric parameters on fabric density. It was anticipated that this study would facilitate the selection of those filaments, yarns and fabric parameters that would produce improved barrier performance.

### Choice of fabrics

After having analysed 29 commercial fabrics woven from polyester multifilament yarns, which were exclusively constructed in plain or twill weaves, three typical fabrics were selected for characterisation in this paper (Table 1). The chosen fabrics had