

## "The Effect of the Stability of the Cloth Factor on the Air Permeability Property of Simple Fabrics of Different Densities"

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### **Abstract:**

The textile structure is considered the designer's tool that enables him to show the beauty of the material, yarns and colors to keep the continuity of development in the textile industry to cope with the latest international fashion styles. The study of fabric structure aims to extract simple physical relationships in the form of ready-made mathematical formulas that can be prepared for fabric designers to produce suitable fabrics for their use, with a definite weight, certain textile structures, tools and specific numbers of warp and weft yarns. The functional performance of any type of fabric depends on the availability of some natural and mechanical properties that suit this performance. These properties change according to the change of the elements of the fabric structure. As contemplated hereby, we cannot separate the external appearance of the fabric from its internal structure. The artificial appearance is nothing but a product of the structure. In other words, the aesthetic appearance of the fabric depends on the structural factors. **Research problem :** To what extent does the fabric cloth factor stability affect the properties of the produced fabrics when the densities of the warp and weft yarns change? The few studies that are related to the study of the various variables that affect the fabric coverage coefficient's stability, the produced is limited to the stability of the warp density in the width of the fabric. **Research aims :** Determining the mathematical relationships between the coefficients of the textile structure and their effect on the properties of the produced fabrics. Studying the effect of the difference in the numerical density of the yarns on the properties of the fabrics in the case of the stability of the cloth factor. **Research importance :** Reaching standard specifications to produce different types of fabrics according to the results that will be gained. Knowing the effect of the textile structure and cover factor on the physical and mechanical properties of the fabrics and thus improving the executive specifications of the fabrics launched in the market. **Research Methodology:** This research follows the analytical and experimental method. **Research sample :** The research depended on the production of 12 samples on a dobby loom with different densities of both warp and weft, using the basic structures (Basket 2/2, Twill 2/2, Broken Twill 2/2, Satin 4+1) and then conducting laboratory tests on these samples with statistical analysis. **Research results :** Despite the stability of cloth factor in all the research experiments, but the fabric samples differed in the property of air permeability. Air permeability was affected by the different factors of study such as the densities of warp and weft besides texture structure at a significant level of 0.01. There is a direct relationship between the density of the warp and the air permeability of the fabrics; while there is an inverse relationship between the density of the wefts and the permeability of the fabrics to air. The highest air permeability affected samples with texture structure basket 2/2, and the least affected the samples with texture structure Twill 2/2. The increase in the density of weft yarns from 16 picks/cm to 32 picks/cm led to a decrease in the air permeability of the fabric samples, subject of study by 54%.

### **Keywords :**

Basic structure, Cover factor, Dobby looms

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