

## Using luminous threads in designing fabrics of lighting units to achieve functional and aesthetic innovative properties

**Aya Mohamed Hassan**

Designer at dally dress company, ayam67804@gmail.com

**Mona Anwar**

Department of Weaving and Spinning, Faculty of Applied Arts, Helwan University, Egypt.

[monaanwar54@yahoo.com](mailto:monaanwar54@yahoo.com)

**Abeer Dawoud**

Department of Weaving and Spinning, Faculty of Applied Arts, Helwan University, Egypt. [AbeerDawoud@arts.helwan.edu.eg](mailto:AbeerDawoud@arts.helwan.edu.eg)

[arts.helwan.edu.eg](mailto:arts.helwan.edu.eg)

### **Abstract:**

Textiles play an important role in home decor because they come in an endless variety of colors, patterns, and materials to achieve texture and aesthetic appeal. as well as functional properties. Optical materials in their various forms have recently become a fertile field for study and research due to their distinctive characteristics. luminous threads are one of these materials that are not only characterized by giving an aesthetic effect but also an optical effect in addition to the possibility of using them for functional purposes because they have the property of radiating light for a period after cutting off the light source. There are many types of lighting units in which textiles are used to cover the lamps to add a kind of luxury and access to many effects that enrich the relationship between the light and the used cloth. Based on this approach, the aim of the research was to study ways of producing fabrics for use in lighting units to add aesthetic effects and improve their usable properties and achieving textures, shadows, and interaction with the light source, as the interaction between the cloth and the light source can cause reflection, refraction, scattering, and shadows. Therefore, we must use appropriate fabrics for lighting units, which ensure development and modernization, whether in aesthetic characteristics or functional performance, through the use of applied methods, materials, threads, and textile structures that allow a new artistic vision, as the design in many fabrics represents an integrated artistic painting that carries artistic and aesthetic values along with performance. These threads can be used in many fields of textiles, as they are safe, non-radioactive, recyclable, and have good stability properties against various variables and These threads can be incorporated into fabrics. Using different optical threads was suitable to produce innovative fabrics used in lighting units, in order to achieve their aesthetic and functional properties. The research samples were produced using optical threads and glow in the dark threads. The designs were made using the weave maker program and the nedgraphic program, and they were implemented with appropriate textile structures. Laboratory tests were conducted to measure the functional properties and the effect of the durability of the fabrics after exposure to light, by applying the tensile strength test and measuring the colour fastness to light on the produced fabrics. The results of the tests were evaluated statistically by performing a one-way ANOVA test.

**Research Aims:** Designing fabrics and lighting units that have a luminous effect and suitable functional characteristics through the selection of materials and weave structure. Blending of optical and polyester threads into fabric by weaving process in order to benefit from the optical properties of the threads to give an aesthetic appearance to the produced textiles. Studying the properties of luminous fabrics used in lighting units and the extent to which their durability is affected after exposure to light.

**Research methodology:** based on the experimental and analytical approach.

**Results:** First: the use of optical threads. The method to implement fabrics using optical threads affects the final shape of the textile piece in terms of design. Extra weft method was applied for a fabric design which is suitable with the characteristics of optical threads. The bending of the threads during weaving can cause the light to scatter, therefore the use of extra weft as a production method was appropriate to achieve the fusion of threads in the fabric. Second: the use of glow-in-dark threads The statistical analysis of the test data showed that the weft tensile strength of the fabrics was insignificantly affected by increasing the exposure period of the samples to light when using different wefts. Therefore, it is appropriate to use luminous threads in this type of fabric because it bears light and is not affected by the light.

### **Keywords:**

POF (Polymeric Optical Fiber), Glow in dark yarns, Tensile strength, Textile design

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