

**The effect of multiple thermoforming techniques on showing properties of (Color transparency texture in glass**

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**Abstract:**

Glass thermoforming techniques are one of the most important techniques in glass production. They are based on the exposure of previously manufactured glass to high temperatures, which are reformed into a new shape in the form of a diversified product, which may be related to functional, aesthetic functions or the integration between them.

This research is related to the techniques of the thermoforming of glass in the field of uses of aesthetic nature, which in this trend is exposed to the constituents of the product form. It is emphasizing the function of color, transparency and texture elements in the aesthetics of the product for each technique. The different methods of production in thermoforming techniques provide a variety of directions and constraints in the formation to meet the requirements of the design conforming to the production in showing elements of product construction.

Hence, the research problem was the lack of sufficient studies on the requirements for achieving the characteristics of color, transparency and texture in thermoforming of glass in the technical diversity of the used methods. The main objective of the research is to develop a set of considerations affecting some of the forming elements of the appearance of glass products by studying the requirements of showing their properties in thermoforming techniques. And thus contribute to the service of different paths associated with the academic and practical studies of technology and users, and hence came the hypothesis of research access to a range of technological considerations to achieve the most important characteristics of the appearance of the form (color – transparency – texture) in relation to the diversity of production methods of thermoforming glass.

The research presented a set of main axes that tried to achieve the research objective, including determining the scientific and artistic foundations of color, transparency, texture and its impact on thermally reforming glass. The second axis of the research was to classify the main technical methods of glass thermoforming with the determination of their thermal levels. The most important results of the research to develop important methods to achieve the characteristics of color, transparency and texture with each technique, In addition to the technical considerations of each element in relation to the variety of production methods of thermoforming glass. These considerations affect the development of a production system that transfers a lot of self-techniques in the implementation of thermoformed glass to scientific and technical systems that are easy to apply and can therefore be developed in design and production paths.

**Keywords:** Thermoforming of glass, Elements of product form, Color, Transparency, Texture.

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