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Gold Leaf Murano Glass *Piastras*' Performance in the *Trencadís* Catalan Modernism Mosaic: Recognition of Alteration Patterns

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1 Introduction

Gold leaf Murano glass is used to create different compositions within the trencadís technique of the architecture of Catalan Modernism; it is a handmade glass product and it is composed of two glasses which have different thicknesses that protect a sheet of gold leaf that is arranged inside. Each component fulfils a specific function; the glass of greater thickness is the one that provides the best conditions of resistance to the break while the glass of smaller thickness, more elastic, protects and integrates to the behaviour of the sheet of gold leaf. On the other hand, the sheet of gold leaf, the most special component, thanks to the reflective and radiation characteristics of the material, is in charge of creating the conditions of brightness and reflection of light that give quality to gold leaf Murano glass.

2 Interpretation of the Manufacturing Process of Gold Leaf Murano Glass

There are few records of the manufacturing process of gold leaf Murano glass. As it is a composite product, its manufacture is an overlap of different layers that have been applied successively in such a way as to ensure the unity of the whole. Manufacture begins with the smallest glass (*cartellina*) that is obtained by blowing and therefore has an initial curvature mark. Gold leaf, a traditional and recognised product but not part of the glass industry, is applied to it. Eventually, it is applied melted in the glass of greater thickness and taking advantage of these conditions of temperature, the set is laminated by rollers until obtaining a flat surface and a cohesive set. Finally, the edges are trimmed to the usual supply format that matches the gold leaf.

As a result of this complex process and its artisanal manufacturing, the final product has several primary defects which will have a significant impact on its future durability as it is exposed to weathering as part of a *trencadís* coating.

3 Research Methodology

As gold leaf Murano glass is not an industrial product, there are several clear variations between samples of the same product. For this reason, the comparative methodology is the most effective one as it can identify the most frequent primary anomalies that occur in the product.

In order to obtain better results from the visual analysis, the flat scanner and the digital optical microscope have been used as the most basic and indispensable digital tools. The flat scanner allows a visual analysis and a good quality digital record for the initial comparison. The digital optical microscope facilitates the interpretation of the location and structure of the primary anomalies that are presented and distributed in the different layers of the product. The location of the anomalies makes it possible to recognize at what point in manufacture they have occurred.

4 Conclusions

- From the moment of its production, golf leaf Murano glass already presents substantial anomalies that can alter its future behaviour and durability.
- The durability of the product falls heavily on the gold leaf itself; its stability will depend strongly on the perimeter sealing of the edges and the contaminants that can be introduced between the two glasses during the manufacturing process (dust, gases, humidity, etc.) as well as on the rough surface of the gold leaf.
- There is no specific regulation for testing the characterisation and durability of gold leaf Murano glass; the tests currently applied are governed by the characteristics of a very different product such as ceramic tile. It is suggested that the application of mirror industry tests will be explored in the future.

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