EVALUATION OF THE IMPACT OF COMMERCIAL CHEMICAL PRODUCTS ON VISIBLE CHANGES IN CERAMIC TILES: A COMPARATIVE ANALYSIS

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1. INTRODUCTION

The practicality of using ceramic tiles as floor and wall covering in homes, commercial and corporate buildings is indisputable. Ceramic tiles are versatile, being suitable for use in both internal and external areas, adapting to spaces with various intensities of movement of individuals. Numerous particular characteristics of ceramic tiles, such as durability, easy cleaning and maintenance, dimensional and aesthetic variety, and application possibilities, support their growing prominence in the market.[1]

To ensure good performance when using ceramic tiles, it is necessary to select the appropriate type of material for each environment, in addition to paying attention to the products used in the cleaning process, as they can interact with the installed ceramic tiles and result in visual imperfections if chemical attack occurs on the surface.

In order to understand the chemical resistance behavior of ceramic tiles relating to the cleaning products available on the market, chemical resistance tests were carried out using everyday cleaning agents. The tests were performed in accordance with the ISO 10545-13:2020 standard[2].

The objective of this work is to qualitatively determine the effect of the action of cleaning products on the visual characteristics of ceramic tiles with surfaces of different nature.

2. MATERIALS AND METHODS

To carry out this study, ceramic tiles with different types of surface were selected: dark glossy, light glossy, wood, light matte, bright clear, bright dark, grained, unglazed and polished.

Chemical resistance was determined on the aforementioned surfaces using the following conventional cleaning products as chemical reagents: detergent, stone cleaner, bleach, sanitizing and multipurpose product. The solutions were kept in contact with the surface of the ceramic tile for a period of 24 hours.

The methodology for analyzing the surface in contact with the solution was based on the ISO 10545-13:2020 standard. The test specimens were evaluated according to a qualitative visual classification under controlled light, examined from various angles, maintaining a standard distance of 25 cm, in order to observe possible changes in color, reflection, texture and general appearance compared to the unexposed surface.

3. RESULTS AND DISCUSSION

The results obtained from the studies carried out are detailed in Table 1, where the classification assigned to each surface can be seen.

SURFACE TYPE	REAGENTS				
	Detergent	Stone Cleaner	Sanitizing	Bleach	Multipurpose
Active principle	Sulfonated organic/benzene compounds	Sodium tripolyphosphate / Sodium Lauryl Ether Sulfate	Hydrochloric acid	Sodium hypochlorite	Dodecylbenzene sulfonic acid
pH	9.9	1.2	1.1	10.1	12.8
	CLASSIFICATION OF CHEMICAL RESISTANCE				
Light glossy	A	B	A	A	A
Dark glossy	A	B	A	B	A
Woody	A	A	A	A	A
Light matte	A	A	A	A	A
Bright clear	A	A	A	A	A
Bright dark	A	B	A	A	A
Grained	A	A	A	A	A
Unglazed	A	A	A	A	A
Polished	A	B	A	B	A

Table 1: *Classification of surface types according to visual analysis*

The standard defines class A as products that present no visible effect, class B as products that present a definite change in appearance and class C as products that present a partial or complete loss of the original surface.

The results show that each type of surface can present a certain chemical resistance in relation to products found on the market. This difference results from the composition of the materials used and the nature of the ceramic tiles, which directly affect whether or not the brightness, color and texture change, serving as a warning to consumers.

4. CONCLUSIONS

The results of the study confirm that different types of ceramic tiles differ in their chemical resistance to common cleaning products. The classification based on the standard reveals that most surfaces maintained their appearance after exposure, with a few exceptions indicating visible changes. It is crucial for consumers and manufacturers to be aware of these interactions in order to ensure the integrity and aesthetics of ceramic tiles throughout their useful life.

5. REFERENCES

[1] REVESTIMENTOS CERÂMICOS E SUAS APLICABILIDADES. Ciências exatas e tecnológicas | Maceió | v. 2 | n.3 | p. 87-97 | Mayo 2015 | periodicos.set.edu.br

[2] ISO 10545-13 - Determination of chemical resistance