

Effects of salt glazes on industrial ceramic tiles produced by fast firing

Assist. Prof. Dr. Nawal Ahmed Ibrahim

Assistant Professor, Department of Ceramics, Faculty of Applied Arts - Helwan University

dr.nawalibrahem@yahoo.com

Research Summary:

Salt glaze is one of the special glazes with distinct aesthetic effects, and it has a well-known production method, which is throwing salt from special holes in the salt kiln after finishing the fire with closing all the outlets of the kiln, and when the salt enters the kiln atmosphere, It evaporates and fills the atmosphere of the kiln and adheres to the surfaces of the products and interacts with silica and alumina in the body, forming a salt glaze. The study has preceded the study on the possibility of obtaining salt glaze by tunnel fire and its application to porcelain bodies was the application with salt of sodium chloride directly on the body and firing in the tunnel kiln, the results appeared distinctive, this research deals with obtaining salt glaze in fast firing for ceramic tiles. Salt was applied to the tiles after several methods, including spraying glue or any organic adhesive on the tile at first, then spreading the soft dry salt onto the glue layer or application salt with silkscreen to regulate salt particles at all parts of the tile ,salt was applied to different types of wall and floor tiles and porcelain tiles directly on the tiles, as well as salt was applied to a tile applied to its lining alone, and applied to a tile with a lining and glaze together, once burned before application and once unburned, and also applied to only glaze , as well as coloration salt or glaze then fire in the fast firing under the same conditions as ordinary ceramic tiles fire in factories, so results of salt glaze are distinguished in texture and color and have aesthetic effect different from the industrial production of ceramic tiles and at the same time ,it is an economic inexpensive glaze, all its ingredients are table salt.

Key words:

Salt glaze, fast firing, ceramic tiles, industrial production, aesthetic effects.

Research problem:

Application of salt glaze to industrial ceramic tiles produced in fast firing.

Search objectives:

- Obtaining salt glaze on the industrial ceramic tiles.
- Introducing the aesthetic effects of some special glazes (salt glaze) in the manufacture of ceramic tiles.

Research hypotheses:

- Salt glazes, the extent of their fire corresponds to the extent of the fire of the ceramic tiles in the factories.
- Salt fire is compatible with fast firing because it is one-time fire.
- The aesthetic effects and contacts of the salt glazing can be an addition to the industrial ceramic tiles.

Search limits:

Ceramic tiles factories that burn in fast firing method, the fire temperature is above 1100 ° C, and the salt used is sodium chloride.

Research Methodology:

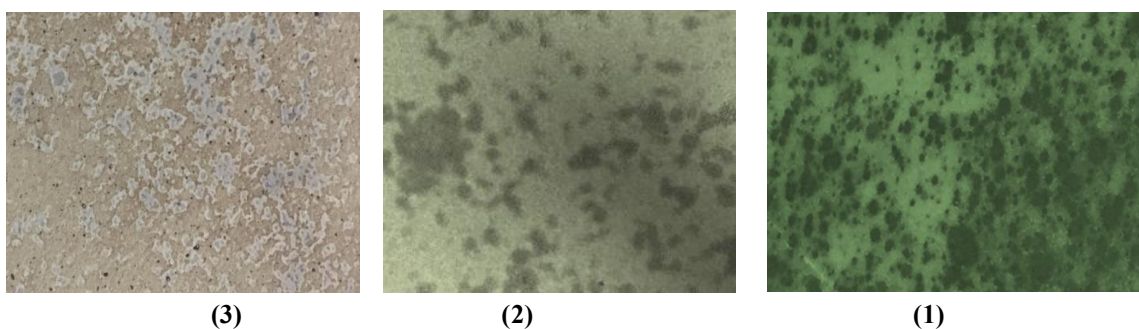
Experimental method

Research themes:

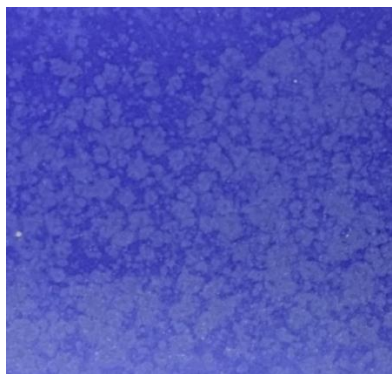
1. Study the effect of the application of salt (Na Cl) on different types of tiles with different body compositions.
2. Study the effect of applying salt to liners.
3. Study the effect of applying salt to burned or unburned liners and glazes .
4. Study the effect of different salt application methods on ceramic tiles.
5. Results.
6. Recommendations.

Research results:

1. Good results of salt glaze can be obtained by fast firing on the ceramic tiles.
2. The results and effects of salt glaze vary according to the composition of the bodies in terms of the forgotten iron and silica present in the body, so we find experience No. (1) applying salt to a wall tile with a high percentage of iron, so the salt glaze appeared in a brown spot, and the application of salt to the body of the floors of iron percentage is less. The body appeared in a lighter olive-beige color, experiment No. (2). As for applying salt to porcelain floor tile, experiment No. (3) Was light in color because the iron content was low and it was rough in appearance to increase the percentage of alumina in the composition and lower the percentage of silica.



3. Applying salt to an unburned liner gives distinct aesthetic results as a result of the interaction of salt with the liner and the body together and the interaction is deep and not superficial like experience No. (4) and we find experience (10) that the application of salt to a wall tile applied to it lining and then colored glaze, the spotting effect of the salt glaze appeared, and the color of the body did not appear as experiment No.(4) , and it could be that salt penetrates into the body at certain distance and interacts. In experiment (4) the reaction reached the body because there is no layer of glaze over the lining, while experiment No. (10) the reaction of salt did not reach to the body due to the presence of a layer of the lining and above it a layer of glaze, so the results appeared like this.

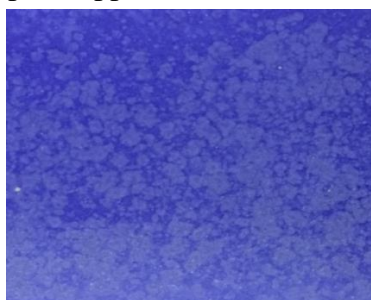


(10)

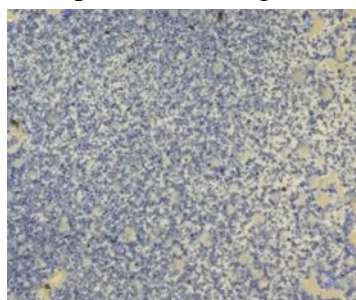


(4)

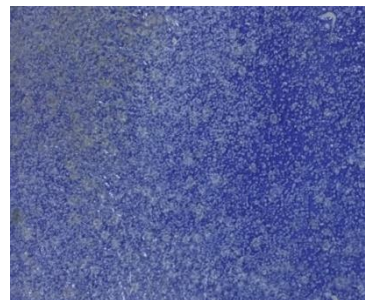
4. The application of salt to a colored glaze gives distinctive aesthetic effects from the coloring of the salt itself and the glaze is not colored, (The two tiles (12) and (13) from porcelain) No (12) was applied by white glaze colored with cobalt oxide 2%, and then applied the gum and then sprinkle dry salt on it , whereas tile No. (13) applied the white glaze and then applied the gum and the salt which was colored by 2% cobalt, the two results are different in the sense and degree of color, and this indicates that salt coloring gives different results than the coloring of the glaze. Noting that the lining was not applied under the glaze, as the tile No. (13) is a wall tile applied to a factory white lining and a white glaze colored with 2% cobalt oxide, the color appeared strong and concentrated from the previous two experiences, and a crystallization in the paint appeared as clear as the roses painted in the glaze.



(10)

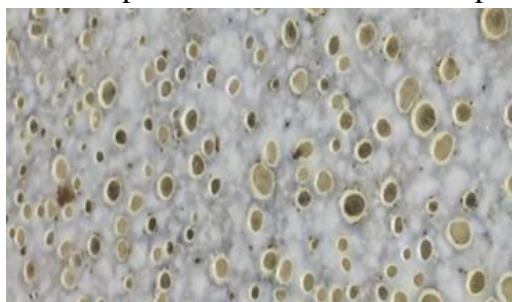


(13)

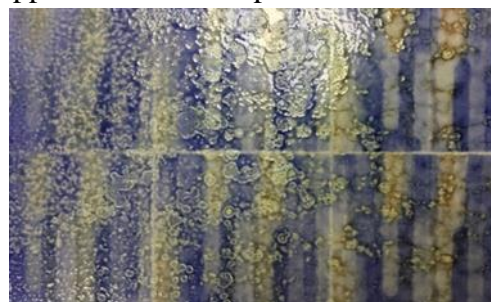


(12)

5. When applying salt to an unburned body that gives distinct and not superficial results, as we find in the following two experiments (6), (8) they are two tiles applied with a factory line and white glaze and then printed on it by (Ink Jet), but experiment No. (6) the salt was applied to unburned tile, but experience No. 8, it was applied to burned tile, in experiment (6), we find a deep effect of the salt and the spots appeared with a deep touch marked.



(8)



(6)

6. The effects of salt glazes are different when applying dry salt on burned or unburned tile applied to white lining as in experiment No. (4), (5) we find the effects on the unburned tile No. (4) are stronger and the color of the body appears in the resulting effects.



(5)

(4)

7 . Applying salt to one layer, whether it is unburnt lining or glaze, shows the color of the body in the resulting effects, as in experiment No. (4), ((9



(9)

(4)

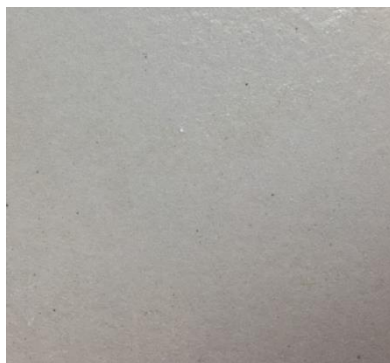
8. The method of applying dry salt by scattering has different aesthetic effects from applying salt to the silk screen, as for the glue, it is applied in both cases by spraying, as in experiment (3), (14) .



(14)

(3)

9. The application of glue and salt using the silkscreen is very close to the effect of ordinary glaze and not the salt glaze characterized by drip and staining, as in experiment No. (15)



(15)

6. Recommendations:

1. Attention to conducting more research on the salt glaze on ceramic tiles of fast firing because of its distinctive aesthetic results, and also considered an inexpensive economic tile.
2. It is possible to pay attention to salt glaze research on the external architecture tiles because of its strong texture and can be of great thickness and withstands a lot of weather factors such as rain and others because the salt glaze is a strong glaze that has great durability.
3. The industrial ceramic tiles factories should pay attention and encourage experiments that give special aesthetic results that characterize industrial production and give a different aesthetic feeling that is not repeated exactly like salt glaze and others.
4. Attention to more practical experiences of salt glaze on ceramic tiles to set its production on the production lines in the factory and solve its problems that may conflict with industrial production.

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