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Study of tonality variation in ceramic tiles caused by rotating decoration systems

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The present work deals with the tonality variation of ceramic tiles decorated by the rotating technique. The study was performed on the production line of single fired ceramic tiles, using an industrial Sincrocollor™ device. The variation in ceramic ink characteristics such as viscosity and density and the variation of tile tonality over time were investigated. The tonality variation of the tiles was analyzed since the beginning of the application process until 60min, with sampling every 20 minutes, by spectrophotometry. Samples of ceramic ink in each application time were analyzed for density (pycnometry) and viscosity (flow time), and then dried and subjected to microstructural analysis (SEM and EDS). At the same time, samples of the inks were applied (0.5 mm) over engobed tiles and subjected to a 30 minutes firing cycle at maximum firing temperature of 1200°C. As a result, from 20 minutes of the beginning of the decorating process the tonality variation of the ceramic tiles is related to the variation of the ceramic ink characteristics. Initially the frit particles used in the glaze are larger (>45µm) than the pigment particles (<1µm). Therefore, the larger frit particles sediment over time, thus allowing the initial consumption of most of the pigment particles and thinner frit particles resulting in diminished color intensity with the time of application of the ink. This effect could be avoided by an adequate milling of the frit fraction of the ink.

Keywords: Sincrocollor, ceramic ink, rotating decoration systems, tonality variation.