

Abstract paper ref. 27

Title : kaolin for digital ceramic decoration

Author : CédricPoilly

Email : cedric.poilly@imerys.com

Organisation : Imerys Ceramics

Country : France

Keywords : kaolin, digital printing, glaze, tiles

An initial study presented for Qualicer 2014 has shown that the digital ink behavior and color development can be affected and controlled by characteristics of the kaolin used in the glaze substrate. In particular the kaolin amount in the substrate composition, its particle size distribution and its shape factor have an influence on the dot spread size and the absorption time of the inks. It was also shown that the particle shape is key to offer a homogeneous surface to control suction. After this first part of the work, a further step was done by using Scanning Electron Microscopy to measure the ink penetration into the substrate. The results were put in perspective with the pore structure of the substrate layer measured by mercury porosimetry. Finally kaolin samples have been treated by either physical or chemical processes in order to modify the wettability of the surface and the ink suction into the substrate layer. The treated kaolins were characterized in terms of chemical analysis, particle size distribution, span, top cut and shape factor. After being incorporated in glaze compositions, they were used as substrate layer on which ink was digitally printed. Depending on the process routes of the kaolin, it was possible to modify such parameters as contact angle, dot spread, and ink penetration depth in the substrate. As a consequence after firing, the printed dot had more or less width and depth. The visual effect on the colors was an increase of the pigment yield and color strength for a given ink pattern. Also in relation with the ink pigment refractoriness, the colored surface had more or less tendency to render a mat or glossy surface aspect depending on the ink spread and penetration. As final part of this study, glaze layers were generated with the treated kaolin samples by using the digital glazing technology. The influence of the kaolin samples on the digital glaze slip properties such as suspension stability, viscosity, surface tension were tested and adapted in order to obtain a homogeneous glaze surface after the digital glazing stage. The fired glaze properties were measured and compared to the same glazes applied with conventional technology.