

Resumen nº 8

INK TECHNOLOGY IN DIGITAL DECORATION OF CERAMIC TILES: AN OVERVIEW

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The rapid and widespread diffusion of digital printers is turning inkjet printing into the leading technology in ceramic tile decoration. The purpose of this overview is to outline the evolution of ink technology in the last decade and to highlight its role in the development of successful digital printing of ceramic tiles. As a matter of fact, quality and reliability of inkjet printing on ceramic surfaces depend to a large extent on ink performances. For this reason, technological requirements of inks extend well beyond the prescriptions of DOD printhead manufacturers, encompassing the storage, interaction with substrate and firing stages. Ink behaviour is theoretically governed by its density, rheological and surface properties in a wide and dynamic range of stress regimes: from the very high stress rates during jetting, drop flight and impact on the tile; to moderate-low stress during drop spreading and penetration into the porous substrate; to minimal stress during footprint drying or ink storage. However, the peculiar conditions occurring in ceramic tile application (including novel printheads) have gradually driven to specific fields for ink properties and performances, where particle size distribution, sedimentation rate, agglomeration phenomena and colour strength are particularly stressed. This situation has generated original pathways in the criteria of ink formulation and pigment processing, entailing different technological solutions concerning colorants, solvent/carriers and additives, that will be shortly reviewed. Relevant parameters (e.g., viscosity, surface tension, Zeta potential, solid load, fluid mechanics dimensionless numbers: Reynolds, Weber, Ohnesorge, Bond) acting on stability over time, jettability, footprint formation and colouring performance will be outlined and discussed to focus on peculiarities of ceramic ink technology and challenges for the next future.
