



DENSIFICATION OF PORCELAIN STONWARE TILES: A SIMPLIFIED MODEL BASED ON TECHNOLOGICAL PROPERTIES

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Porcelain stoneware tiles are sintered by fast firing, through partial vitrification and viscous flow of an abundant liquid phase. Firing schedules are designed to achieve a very low water absorption ($\sim 0.1\%$) and controlled shrinkage, for maximum temperatures around 1200°C . By this way, the gresification model predicts to get the highest bulk density, which nevertheless depends on the closed porosity left during sintering. However, it may happen that the minimum water absorption is reached only after a shrinkage and bulk density turn around, implying that a significant amount of closed porosity developed. A deviation from the expected behavior can occur particularly in case of strong fluxes, like those containing large amounts of alkaline-earth oxides or boron compounds. In order to have a facile check on sintering based on easily available technological properties, the classic gresification sketch has been revisited, by proposing a simplified model to estimate the residual porosity in porcelain stoneware by matching water absorption and bulk density.