

## **A Comparison on the Effects of Alumina and White Fused Alumina On Microstructure of Glazes**

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Alumina is a synthetic raw material manufactured from bauxite by the Bayer process, whose  $\text{Al}_2\text{O}_3$  content is typically higher than 99%. In tile manufacturing,  $\alpha\text{-Al}_2\text{O}_3$  is the main type of alumina used in bodies and glazes. This raw material acts as an opacifier in porcelain tiles and as a matting agent in glazes. White Fused Alumina is produced by fusing calcined alumina in an electric arc furnace under carefully controlled conditions. It is usually employed in floor tile glazes in order to increase the abrasion resistance. This study was undertaken with a view to establishing a better understanding how the alumina and fused alumina effect the microstructure of both wall and floor tile glazes. In the study; transparent glazes with different alumina and fused alumina addition were prepared by using industrial raw materials. After applying the glazes on bodies; the compositions were fired in relevant industrial kilns. In the study it was shown that corund was the main detected phase in glazes incorporated with white fused alumina. This result suggested that white fused alumina didn't react with glassy phase to form any other crystalline phases. This result can be attributed to higher refractoriness of white fused alumina. Anorthite ( $\text{CaO}.\text{Al}_2\text{O}_3.\text{SiO}_2$ ) and gahnite ( $\text{ZnO}.\text{Al}_2\text{O}_3$ ) phases were, on the other hand, detected in the glazes with alumina addition. Anorthite and gahnite formation suggested that alumina reacted with  $\text{CaO}$ ,  $\text{ZnO}$  and  $\text{SiO}_2$  in the glassy phase. Higher amount of crystal formation which hinders viscous flow caused higher porous structure in glazes with alumina addition.

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