

Estimation and Validation of Free Lime Analysis of Clinker by Quantitative Phase Analysis Using X ray diffraction

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Abstract : Determining the content of free lime is especially important to judge reactivity of the raw materials and clinker quality. The free lime limit isn't the same for all cements; it depends on several factors, especially the temperature reached during the cooking and the grain size distribution in cement after grinding. Estimation of free lime by conventional method is influenced by the presence of portlandite and misleads the actual free lime content in the clinker for quality check up conditions. To ensure the product quality according to the standard specifications in terms of within the quality limits or not, a reliable, precise, and very reproducible method to quantify the relative phase abundances in the Portland Cement clinker and Portland Cements is to use X-ray diffraction (XRD) in combination with the Rietveld method. In the present study, a methodology was proposed using XRD to validate the obtained results of free lime by conventional method. The XRD and TG/DTA results confirm the presence of portlandite in the clinker to take the decision on the obtained free lime results through conventional method.

Keywords : free lime, quantitative phase analysis, conventional method, x ray diffraction

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