

Performance of Limestone Calcined Clay with Oil Well Cement

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Calcined clay, limestone, metakaolin, LC3

ABSTRACT

The goal of this research is to develop wellbore barrier materials with robust zonal isolation, mechanical integrity and durability. In order to achieve the aforementioned objectives, oil cementing systems were selected based on their influence on strength retrogression, high temperature degradation and chemical decomposition by fluids such as CO₂ and H₂S. Recent studies on limestone calcined clay cements (LC3) have demonstrated promising results for sustainability of cement and concrete applications. For the LC3 system the following materials were used in variable proportions for slurry preparation; Class H cement (C), limestone (LS), metakaolin (MK). Metakoalin has been observed to possess pozzolanic properties, which contributes to increased strength and durability. Limestone has been reported to accelerate cement hydrations providing increased surface area and modifies hydration products of cement, thus enhancing properties. The goal of this work was to gain impact of limestone and calcined clay on strength, permeability and hydration mechanism for LC3 systems maintained at various temperatures and w/c.