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CHARACTERIZATION OF COPOLYMERS POLY(ETHYLENE-CO-VINYL ACETATE)AND EVALUATION OF THEIR EFFECTS IN THE MODIFIED MORTARS PROPERTIES

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Poly(ethylene-co-vinyl acetate), EVA, is a water-redispersible polymer used as cement modifier. Latex modified Portland cement mortars based on EVA are the standard product in the market for ceramic tile installation. However, several EVA latexes are available with different features, including amount of each copolymer, type of protector colloid, and nature of anti-blocking agent. In this sense, the object of the present work was to characterize two EVA redispersible powders with different amounts of vinyl acetate groups in their composition and evaluated the effect of the use of these two EVAs in some properties of mortars.

X-Ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), and mechanical evaluations were conducted in order to characterize the two selected EVA. Also, we have prepared mortars with additives (modified mortar) and reference mortar (without polymer) using Portland cement CPII-F32 and quartzous sand. Mortars were mixed in the 1:1.7 ratio (cement: sand), in weight, and 0.60 water to cement ratio. The additives were incorporated in amounts of 5%, 10%, and 15% in relation to cement weight. Consistency, water retention, air entrainment, and flexural strength of mortars were evaluated. In order to evaluate the effect of EVAs on adhesion properties pull of tests were conducted in a single layer of mortar with average thickness of 6 mm applied on the back side of each porcelain ceramic tile. FTIR studies were also carried out in order to evaluate the effect of alkaline medium of cement paste in the properties EVA.

The results of XRD, FTIR, and mechanical tests allow us to characterize and differentiate both EVA products. The global features of polymers are a consequence of the polymer composition and type and kind of surfactant and anti-caking agent. Also some properties of the EVA films in mortars may be predicted. Mortar tests evaluation showed that the surfactant used in the process to obtain the powder polymer greatly affects mortar properties at fresh state. Water retention was also a consequence of latex particles presence. Flexural strength values measured were a consequence of EVA film mechanical properties. Adhesion pull off tests have shown that the adherence between tile and modified mortars were quite dependent on the hydrolysis of EVA polymer measured through FTIR.

Based on the results obtained, in the selection of the EVA for mortar modification, the evaluation of its composition/properties is crucial to the final properties of the mortar, including the adherence at interface tile/modified mortar.