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Experimental analyses of the fire resistance and thermal conductivity of geopolymer materials

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The Geopolymer is an inorganic polymer material with intrinsic fire resistance properties with potential to be used as a thermal barrier. Obtained by the geopolymerization process by the synthesis of a precursor rich in aluminum and silicates and an alkali activator. Depends on the chemical composition and synthesis procedure the fire resistance and thermal conductivity can be improved. In addition the fire resistance, the knowledge about the thermal conductivity of the geopolymer used as a thermal barrier is important since the material to be protected usually present low degradation temperature. Considering a fire situation, its important to know the time that the structure support up to the fire control. In this study, research developed in partner of industry and university with the insertion of Brazilian researchers in the national industry by funding from CNPq, was simulated field fire conditions to evaluate the thermal conductivity of three different geopolymers. A test dispositive was developed in accordance with Annex A - Fire endurance Test for Composite Piping Repair to execution of the fire tests. The temperature on the samples was monitored and the integrity after the fire test was visually evaluated. The results show the influence of the geopolymer type in extreme fire conditions (hydrocarbon fire) and the possibility to use as a thermal barrier of materials with low resistance of temperature.