

Effect of Bulk Density and Fiber Blend Content of Nonwoven Textiles on Flammability Properties

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Abstract : Flammability plays an important role in applications such as thermal and acoustic insulation and other technical nonwoven textiles. The study was conducted in an attempt to investigate the flammability behavior of nonwoven textiles in relation to their structural and material characteristics, with emphasis given to the blending ratios of flammable and non-flammable fibers or fibers with reduced flammability. Nonwoven structures made of blends of viscose/oxidized polyacrylonitrile (VS/oxidized PAN fibers and polyethylene terephthalate/oxidized polyacrylonitrile (PET/oxidized PAN) fibers in several bulk densities are evaluated. The VS/oxidized PAN blend is model material. The flammability was studied using a cone calorimeter. Reaction to fire was observed using the small flame test method. Interestingly, the results show some of the blending ratios do not react to the heat in linear response to bulk density. This outcome can have a huge impact on future product development in fire safety and for the general understanding of flammability behavior of nonwovens made of staple fibers.

Keywords : bulk density, cone calorimetry, flammability, nonwoven textiles

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