

# A Novel Approach to Flammability Assessment of High-Loft Nonwoven Textiles

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**Abstract:** High-loft nonwoven textiles are currently commonly used for a wide range of technical applications where fire safety plays at least as important role as other characteristic of those materials. Although there are plenty of lab scale methods aimed on testing flammability behavior of textile materials, which are also used for technical textiles, all of them are based on tests working with planar textile samples where the sample thickness is strictly limited. Those methods also do not consider if the air access to the sample is partly or completely reduced, therefore the state of the boundary conditions. The aim of this experiment was to design and assemble a novel operational apparatus for testing of a reaction of high-loft nonwoven textile to a small flame under defined boundary conditions. The change in material flammability behavior, which was defined here as the ability of the material to

ignite after exposure to a small flame and eventually its further burning, was studied in correlation with a change of boundary conditions and bulk densities. The measurement was performed on a set of model blend samples of multiple values of volume density made of PES, coPES and viscose.

**Keywords:** *Flammability, nonwoven textiles, high-loft nonwovens, boundary conditions, carding, cross lapping, thermal bonding, model material, polyester fibers, bicomponent fibers, viscose fibers.*