

The Effect of Rheological Properties and Spun/Meltblown Fiber Characteristics on “Hotmelt Bleed through” Behavior in High Speed Textile Backsheet Lamination Process

Authors : Kinyas Aydin, Fatih Erguney, Tolga Ceper, Serap Ozay, Ipar N. Uzun, Sebnem Kemaloglu Dogan, Deniz Tunc

Abstract : In order to meet high growth rates in baby diaper industry worldwide, the high-speed textile backsheet lamination lines have recently been introduced to the market for non-woven/film lamination applications. It is a process where two substrates are bonded to each other via hotmelt adhesive (HMA). Nonwoven (NW) lamination system basically consists of 4 components; polypropylene (PP) nonwoven, polyethylene (PE) film, HMA and applicator system. Each component has a substantial effect on the process efficiency of continuous line and final product properties. However, for a precise subject cover, we will be addressing only the main challenges and possible solutions in this paper. The NW is often produced by spunbond method (SSS or SMS configuration) and has a 10-12 gsm (g/m^2) basis weight. The NW rolls can have a width and length up to 2.060 mm and 30.000 linear meters, respectively. The PE film is the 2nd component in TBS lamination, which is usually a 12-14 gsm blown or cast breathable film. HMA is a thermoplastic glue (mostly rubber based) that can be applied in a large range of viscosity ranges. The main HMA application technology in TBS lamination is the slot die application in which HMA is spread on the top of the NW along the whole width at high temperatures in the melt form. Then, the NW is passed over chiller rolls with a certain open time depending on the line speed. HMAs are applied at certain levels in order to provide a proper de-lamination strength in cross and machine directions to the entire structure. Current TBS lamination line speed and width can be as high as 800 m/min and 2100 mm, respectively. They also feature an automated web control tension system for winders and unwinders. In order to run a continuous trouble-free mass production campaign on the fast industrial TBS lines, rheological properties of HMAs and micro-properties of NWs can have adverse effects on the line efficiency and continuity. NW fiber orientation and fineness, as well as spun/melt blown composition fabric micro-level properties, are the significant factors to affect the degree of “HMA bleed through.” As a result of this problem, frequent line stops are observed to clean the glue that is being accumulated on the chiller rolls, which significantly reduces the line efficiency. HMA rheology is also important and to eliminate any bleed through the problem; one should have a good understanding of rheology driven potential complications. So, the applied viscosity/temperature should be optimized in accordance with the line speed, line width, NW characteristics and the required open time for a given HMA formulation. In this study, we will show practical aspects of potential preventative actions to minimize the HMA bleed through the problem, which may stem from both HMA rheological properties and NW spun melt/melt blown fiber characteristics.

Keywords : breathable, hotmelt, nonwoven, textile backsheet lamination, spun/melt blown

Conference Title : ICTCLT 2017 : International Conference on Textile Coating and Laminating Technology

Conference Location : Paris, France

Conference Dates : July 20-21, 2017