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New Formulation of FFS3 Layered Blown Films Containing Toughened Polypropylene and Plastomer with Superior Properties

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Abstract : Adding toughened polypropylene and plastomer in FFS 3 layered blown film formulation resulted in superior dart impact and MD tear resistance along with acceptable tensile properties in TD and MD. The optimum loading of toughened polypropylene and plastomer in each layer depends on miscibility of polypropylene in polyethylene medium, mechanical properties, welding characteristics in bags top and bottoms and friction coefficient of film surfaces. Film property tests and efficiency of FFS machinery during processing in industrial scale showed that about 4% loading of plastomer and 16% of toughened polypropylene (reactor grade) in middle layer and loading of 0-1% plastomer and 5-19% of toughened polypropylene in other layers results optimum characteristics in the formulation based on 1-butene LLDPE grade with MFR of 0.9 and LDPE grade with MFI of 0.3. Both the plastomer and toughened polypropylene had the MFI of blow 1 and the TiO2 and processing aid masterbatches loading was 2%. The friction coefficient test results also represented the anti-block masterbatch could be omitted from formulation with adding toughened polypropylene due to partial miscibility of PP in PE which makes the surface of films somewhat bristly.

Keywords : FFS 3 layered blown film, toughened polypropylene, plastomer, dart impact, tear resistance
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