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(54) Title: NOVEL POLYMERS

(57) Abstract: Copolymers of ethylene and  $\alpha$ -olefins are provided having (a) a density (D) in the range 0.900 - 0.940 g/cm<sup>3</sup>, (b) a melt index MI<sub>2</sub> (2.16 kg, 190°C) in the range of 0.01 - 50 g/10 min, (c) a melt index MI<sub>2</sub> (2.16 kg, 190°C) and Dow Rheology Index (DRI) satisfying the equation  $[DRI/MI_2] > 2.65$ , and (d) a Dart Drop Impact (DDI) in g of a blown film having a thickness of 25  $\mu$ m produced from the copolymer satisfying the equation  $DDI \geq 19000 \times \{1 - \exp[-750(D - 0.908)^2]\} \times \{\exp[(0.919 - D)/0.0045]\}$ . The copolymers may suitably be prepared by use of metallocene catalysts and are preferably prepared in multistage processes carried out in loop reactors in the slurry phase. The copolymers exhibit long chain branching as defined by Dow Rheology Index (DRI) and exhibit unexpected improvements in mechanical properties, in particular dart drop impact, when extruded into blown films.



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