

CLAIMS

1. A polymer composition comprising:

at least one multimodal ethylene-based polymer having a density from 0.900 to 0.940 g/cc when measured according to ASTM D792 and a melt index (I_2) from 0.1 to 10 g/10 min when measured according to ASTM D1238 at a load of 2.16 kg and temperature of 190 °C, the multimodal ethylene-based polymer comprising a first ethylene-based component, a second ethylene-based component, and a third ethylene-based component, wherein each of the first ethylene-based component, the second ethylene-based component, and the third ethylene-based component are polymerized reaction products of ethylene monomer and at least one C_3 – C_{12} α -olefin comonomer, wherein;

the first ethylene-based component has a density of 0.860 to 0.915 g/cc, and a weight-average molecular weight ($M_{w(GPC)}$) of 128,000 g/mol to 363,000 g/mol, the multimodal ethylene-based polymer comprising at least 20% by weight of the first ethylene-based component;

the second ethylene-based component has a density greater than the density of the first ethylene-based component and less than 0.940 g/cc, and a weight-average molecular weight ($M_{w(GPC)}$) of 88,500 g/mol to 363,000 g/mol, and

the third ethylene-based component has a density greater than the density of the second ethylene-based component.

2. The polymer composition of claim 1, wherein the first ethylene-based component has a C_3 – C_{12} α -olefin comonomer incorporation of at least 0.5 mol.%, and the second ethylene-based component has a C_3 – C_{12} α -olefin comonomer incorporation of at least 0.5 mol.%.

3. The polymer composition of any preceding claim, wherein the multimodal ethylene-based polymer comprises from 20 to 40% by weight of the first ethylene-based component, from 10 to 40% by weight of the second ethylene-based component, 25 to 60% by weight of the third ethylene-based component.

4. The polymer composition of any preceding claim, wherein the melt index (I_2) of the multimodal ethylene-based polymer is from 0.3 to 2.0 g/10 min.
5. The polymer composition of any preceding claim, wherein the multimodal ethylene-based polymer has an I_{10}/I_2 value from 9 to 15, where I_{10} is measured according to ASTM D1238 at a load of 10 kg and temperature of 190 °C.
6. The polymer composition of any preceding claim, wherein the density of the multimodal ethylene-based polymer is from 0.910 to 0.940 g/cc.
7. The polymer composition of any preceding claim, wherein the density of the first ethylene-based component is from 0.865 to 0.910 g/cc, and the melt index (I_2) of the first ethylene-based component is from 0.01 to 0.2 g/10 min.
8. The polymer composition of any preceding claim, wherein the density of the second ethylene-based component is from 0.880 to 0.930 g/cc, and the melt index (I_2) of the second ethylene-based component is from 0.2 to 1.0 g/10 min.
9. The polymer composition of any preceding claim, wherein the density of the third ethylene-based component is from 0.935 to 0.965 g/cc, and a weight-average molecular weight ($M_{w(GPC)}$) is less than 88,500 g/mol.
10. The polymer composition of any preceding claim, wherein the C_3 – C_{12} comonomer is 1-octene or 1-hexene.
11. The polymer composition of any preceding claim, wherein the multimodal ethylene-based polymer has a molecular weight distribution ($M_{w(GPC)}/M_{n(GPC)}$) of at least 5, or preferably from 5 to 12.
12. The polymer composition of any preceding claim, wherein the third ethylene-based component has a melt index (I_2) from 20 to 750 g/10 mins.
13. The polymer composition of any preceding claim, wherein the multimodal ethylene-based polymer comprises 35 to 60% by weight of the third ethylene-based component.

14. The polymer composition of any preceding claim, wherein the multimodal ethylene-based polymer has a Crystallization Elution Fractionation (CEF) weight fraction greater than 23 % and a weight-average molecular weight ($M_{w(CEF)}$) greater than 100,000 g/mol at a temperature range from 20 °C to $T_{critical}(T_c)$.
15. An article comprising the polymer composition of any preceding claim, wherein the article is a blown or cast film.