CLAIMS

1. A trimodal polyethylene having a multimodal molecular weight distribution comprising:

(i) 20-70% wt of a lower molecular weight ethylene homopolymer;

(ii) 20-70% wt of a first higher molecular weight ethylene copolymer, wherein said first higher molecular weight ethylene copolymer has a comonomer content of 0.3 to 2.5 %wt and a Mw/Mn of 5-18; and

(iii) 0.5-9.5% wt of a second higher molecular weight ethylene copolymer, wherein said second higher molecular weight ethylene copolymer has a comonomer content of 1 to 20 %wt and a Mw/Mn of 5-23;

wherein said second higher molecular weight ethylene copolymer has a greater weight average molecular weight than said first higher molecular weight ethylene copolymer, said second higher molecular weight ethylene copolymer has a higher %wt comonomer content than said first higher molecular weight ethylene copolymer and said second higher molecular weight ethylene copolymer is a Ziegler Natta polymer,

wherein Mn represents a number average molecular weight and Mw represents a weight average molecular weight.

2. A polyethylene as claimed in claim 1, wherein said second higher molecular weight copolymer is present in an amount of 1.2 to 8.5 % wt.

3. A polyethylene as claimed in claim 2, wherein said second higher molecular weight copolymer is present in an amount of 1.5-6 % wt.

4. A polyethylene as claimed in any one of claims 1 to 3, wherein said second higher molecular weight copolymer comprises one or more α-olefin comonomers.

5. A polyethylene as claimed in claim 4, wherein said α-olefin is selected from propylene, 1-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-octene and mixtures thereof.

6. A polyethylene as claimed in any one of claims 1 to 3, wherein said second higher molecular weight copolymer is an ethylene 1-butene copolymer.

7. A polyethylene as claimed in any one of claims 1 to 3, wherein said first higher molecular weight copolymer comprises one or more α-olefin comonomers.

8. A polyethylene as claimed in claim 7, wherein said α-olefin is selected from propylene, 1-butene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-octene and mixtures thereof.

9. A polyethylene as claimed in any one of claims 1 to 3, wherein said first higher molecular weight copolymer is an ethylene 1-butene copolymer.

10. A polyethylene as claimed in any one of claims 1 to 3, wherein said second higher molecular weight copolymer has a weight average molecular weight of 200,000 to 2,000,000 g/mol.

11. A polyethylene as claimed in any one of claims 1 to 3, wherein said first higher molecular weight copolymer has a weight average molecular weight of 200,000 to 700,000 g/mol.

12. A polyethylene as claimed in any one of claims 1 to 3, wherein said lower molecular weight ethylene homopolymer has a MFR_2 of 50-4000 g/10min.

13. A polyethylene as claimed in any one of claims 1 to 3, wherein said lower molecular weight ethylene homopolymer, said first higher molecular weight ethylene copolymer and said second higher molecular weight ethylene copolymer are prepared by Ziegler Natta catalyst polymerisation.

14. A polyethylene as claimed in any one of claims 1 to 3, having a density of 945-962 kg/m^3.

15. A polyethylene as claimed in any one of claims 1 to 3 having a MFR_5 of 0.15-0.6 g/10min.

16. A process for the preparation of a polyethylene as claimed in any one of claims 1 to 3 comprising polymerising ethylene and, as required, at least one other α-olefin to yield said polyethylene, wherein said polymerisation is carried out in three steps.

17. A process as claimed in claim 16, comprising the sequential steps (a)-(c):

(a) polymerising ethylene in a first reactor to produce a lower molecular weight ethylene homopolymer;

(b) polymerising ethylene and an α-olefin comonomer in a second reactor to produce a first higher molecular weight ethylene copolymer; and

(c) polymerising ethylene and an α-olefin comonomer in a third reactor to produce a second higher molecular weight ethylene copolymer.

18. A process as claimed in claim 16, comprising the sequential steps (a)-(c):

(a) polymerising ethylene in a first reactor to produce a lower molecular weight ethylene homopolymer;

(b) polymerising ethylene and an α-olefin comonomer in a second reactor to produce a second higher molecular weight ethylene copolymer; and

(c) polymerising ethylene and an α-olefin comonomer in a third reactor to produce a first higher molecular weight ethylene copolymer.

19. A composition comprising a polyethylene as claimed in any one of claims 1-3.

20. A composition as claimed in claim 19 having a FNCT time to failure of greater than 20 hours as measured according to ISO16770 with 8.5MPa load at a temperature of 80°C.

21. A composition as claimed in claim 19 having a Charpy Impact of greater than 12 kJ/m^2 as measured according to ISO179-1/1eA on compression moulded specimens at +23°C.

22. A composition as claimed in claim 19 having a Shore hardness of at least 50 as measured according to a digital shoremeter.

23. An article comprising a polyethylene as claimed in any one of claims 1-3 or a composition comprising the polyethylene as claimed in any one of claims 1-3.

24. An article as claimed in claim 23 which is a pipe.

25. A process for the preparation of an article as claimed in claim 23, comprising moulding the polyethylene or the composition.