CLAIMS

1. A fibre, tape, filament or similar comprising a polyethylene composition comprises a copolymer of ethylene and a α-olefin said copolymer having
(a) a density in the range 0.900 – 0.970 g/cm^3, and
(b) a melt index MI_2 (2.16 kg,190°C) in the range 0.7 – 50 g/10 min
characterized in that said fibre, tape, filament or similar has a tenacity, elongation at break (%) and melt index wherein
$[\delta\log(\text{elongation})/\delta(\text{tenacity})] \geq M \times (\text{melt index}) + C$
wherein M = -0.45 and C = 0.55

2. A fibre, tape, filament or similar comprising a polyethylene composition comprises a copolymer of ethylene and a α-olefin having a unimodal molecular weight distribution said copolymer having
(a) a density in the range 0.900 – 0.970 g/cm^3, and
(b) a melt index MI_2 (2.16 kg,190°C) in the range 0.7 – 50 g/10 min
characterized in that said fibre, tape, filament or similar has a tenacity, elongation at break (%) and melt index wherein
$[\delta\log(\text{elongation})/\delta(\text{tenacity})] \geq M \times (\text{melt index}) + C$
wherein M = -0.48 and C = 0.68

3. A fibre, tape, filament or similar comprising a polyethylene composition comprises a copolymer of ethylene and a α-olefin prepared by polymerization in the presence of a single site catalyst system said copolymer having
(a) a density in the range 0.900 – 0.970 g/cm^3, and
(b) a melt index MI_2 (2.16 kg,190°C) in the range 0.01 – 50 g/10 min
characterized in that said fibre, tape, filament or similar has a tenacity, elongation at break (%) and melt index wherein
$[\delta\log(\text{elongation})/\delta(\text{tenacity})] \geq M \times (\text{melt index}) + C$
wherein M = -0.43 and C = 1.2

4. A fibre, tape, filament or similar according to claim 3
wherein M = -0.43 and C = 0.9

CLAIMS

~~5. A fibre, tape, filament or similar according to claim 3 wherein M = 0.43 and C = 0.78~~

~~6~~1. A fibre, tape, filament or similar comprising a polyethylene composition comprises a copolymer of ethylene and a α-olefin prepared by polymerization in the presence of a single site catalyst system said copolymer having

(a) a density in the range 0.900 – 0.970 g/cm^3, and

(b) a melt index MI_2 (2.16 kg,190^{O}C) in the range 0.01 – 50 g/10 min

characterized in that said fibre, tape, filament or similar has a tenacity and elongation at break (%) wherein

(i) elongation (%) ≥ 21.4 x (tenacity) $^{-1.05}$

(ii) tenacity ≥ 0.16 N/Tex

~~7~~2. A fibre, tape, filament or similar according to claim ~~6~~ 1 wherein

elongation (%) ≥ 11.5 x (tenacity) $^{-1.4}$

~~8~~3. A fibre, tape, filament or similar according to any of the preceeding claims ~~wherein~~ having a melt index ~~is~~ in the range 0.7 – 25 g/10 min.

~~9~~4. A fibre, tape, filament or similar according to any of the preceeding claims ~~wherein~~ having a melt index ~~is~~ in the range 0.7 – 15 g/10 min.

~~10~~5. A fibre, tape, filament or similar according to any of the preceeding claims ~~wherein~~ having a melt index ~~is~~ in the range 0.7 – 5 g/10 min.

~~11~~6. A fibre, tape, filament or similar according to any of the preceding claims wherein said polyethylene has a density in the range 0.915 – 0.970 g/cm^3.

~~12~~7. A fibre, tape, filament or similar according to any of the preceding claims wherein said polyethylene has a density in the range 0.915 – 0.950 g/cm^3.

~~13~~8. A fibre, tape, filament or similar according to any of the preceding claims wherein said polyethylene composition has a molecular weight distribution in the range 3 to 8.

~~14~~9. A fibre, tape, filament or similar according to any of the preceeding claims being in a stretched form.

~~15~~10. A fibre, tape, filament or similar according to any of the preceding claims having a draw ratio in the range 1:4 to 1:10 and preferably 1:5 to 1:10.

~~16. A fibre, tape, filament or similar according to claim 3 wherein said polyethylene composition has~~

~~(i) a density in the range 0.900 – 0.970 g/cm^3;~~

~~(ii) a melt index MI_2 (2.16 kg, 190°C) in the range 0.01 – 50 g/10 min,~~

~~(iii) a melt flow ratio (MFR) in the range 20 to 50,~~

~~(iv) a molecular weight distribution (Mw/Mn) in the range 3 to 8, and~~

~~(v) a melt strength pressure derivative δ(MS)/δP in the range 0.15 – 1.5.~~

~~17. A fibre, tape, filament or similar according to claim 3 wherein said polyethylene composition has~~

~~(i) a density in the range 0.930 – 0.970 g/cm^3;~~

~~(ii) a melt index MI_2 (2.16 kg, 190°C) in the range 0.1 – 3.5 g/10 min,~~

~~(iii) a melt elastic modulus G' (G'' = 500 Pa) in the range 40 – 150, and~~

~~(iv) a ratio of complex dynamic shear viscosities $\eta^*(0.1)/\eta^*(100)$ in the range 1.5 – 5.5.~~

~~18~~11. A fibre, tape, filament or similar according to any of the preceeding claims wherein said α- olefin comprises C4 – C12 carbon atoms.

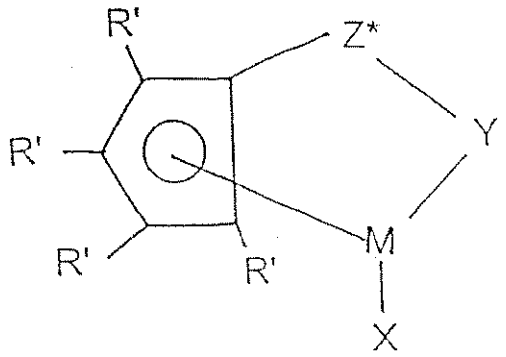
~~19~~12. A fibre, tape, filament or similar according to claim ~~18~~ 11 wherein said α- olefin comprises 1-hexene.

~~20~~13. A fibre, tape, filament or similar according to any of the preceeding claims wherein said polyethylene composition is prepared by polymerization of ethylene and an α-olefin in the presence of a metallocene catalyst system.

~~21~~14. A fibre, tape, filament or similar according to claim ~~20~~ 13 wherein said metallocene catalyst system comprises a monocyclopentadienyl metallocene complex.

~~22~~15. A fibre, tape, filament or similar according to claim ~~21~~ 14 wherein said monocyclopentadienyl metallocene complex has the general formula:

.



wherein:-

R' each occurrence is independently selected from hydrogen, hydrocarbyl, silyl, germyl, halo, cyano, and combinations thereof, said R' having up to 20 nonhydrogen atoms, and optionally, two R' groups (where R' is not hydrogen, halo or cyano) together form a divalent derivative thereof connected to adjacent positions of the cyclopentadienyl ring to form a fused ring structure;

X is a neutral η^4 bonded diene group having up to 30 non-hydrogen atoms, which forms a π-complex with M;

Y is -O-, -S-, -NR*-, -PR*-,

M is titanium or zirconium in the + 2 formal oxidation state;

Z* is SiR^*_2, CR^*_2, $SiR^*_2SiR^*_2$, $CR^*_2CR^*_2$, $CR^*{=}CR^*$, $CR^*_2SiR^*_2$, or GeR^*_2, wherein:

R* each occurrence is independently hydrogen, or a member selected from hydrocarbyl, silyl, halogenated alkyl, halogenated aryl, and combinations thereof, said R* having up to 10 non-hydrogen atoms, and optionally, two R* groups from Z* (when R* is not hydrogen), or an R* group from Z* and an R* group from Y form a ring system.

~~23~~16. A fibre, tape, filament or similar according to any of the preceeding claims wherein said polyethylene composition comprises (a) a copolymer of ethylene and a α- olefin prepared by polymerization in the presence of a single site catalyst system

and (b) a polymer prepared by polymerization in the presence of a Ziegler Natta catalyst system.

~~24~~17. A fibre, tape, filament or similar according to claim ~~23~~ 16 wherein said polyethylene composition comprises a polymer blend of (A) 1 – 99% by weight of a copolymer of ethylene and a α-olefin having from 3 to 10 carbon atoms, and (B) from 1 – 99% by weight of a copolymer of ethylene and a α-olefin having from 3 to 10 carbon atoms, prepared by polymerization in the presence of a single site catalyst system, wherein the sum of (A) and (B) is 100 %, said copolymer blend having

(a) a density in the range 0.900 – 0.970 g/cm^3, and

(b) a melt index MI_2 (2.16 kg,190^{O}C) in the range 0.7 – 50 g/10 min

characterized in that said fibre, tape, filament or similar has a tenacity, elongation at break (%) and melt index wherein

$[\delta\log(\text{elongation})/\delta(\text{tenacity})] \geq M \times (\text{melt index}) + C$

wherein M = - 0.45 and C = - 0.55

~~25~~18. An article comprising fibre, tape, filament or similar according to any of the preceeding claims.

~~26~~19. An article according to claim ~~25~~ 18 which is an artificial grass.

~~27~~20. An article according to claim ~~25~~ 18 which are woven and nonwoven fabrics.

~~28~~21. An article according to claim ~~25~~ 18 which are cordages, ropes and netting.

~~29~~22. An article according to claim ~~25~~ 18 which is a flexible intermediate bulk container (FIBC).