

### Claims

1. A polyethylene composition comprising a base resin comprising  
a low molecular weight ethylene polymer component and a high molecular  
weight ethylene polymer component, wherein the high molecular weight  
ethylene polymer component has a higher weight average molecular weight than  
the low molecular weight ethylene polymer component,  
wherein the base resin has a density of at least 958.0 kg/m<sup>3</sup>,  
and the polyethylene composition a melt flow rate MFR<sub>2</sub> (190°C, 2.16 kg) of  
from 0.50 to 0.80 g/10 min and a molecular weight distribution being the ratio of  
the weight average molecular weight and the number average molecular weight,  
Mw/Mn, of from 10.0 to 15.0.
2. The polyethylene composition according to claim 1, wherein the low molecular  
weight ethylene polymer component is a low molecular weight ethylene  
homopolymer component and the high molecular weight ethylene polymer  
component is a high molecular weight ethylene copolymer component  
comprising comonomer units selected from at least one alpha-olefin having from  
4 to 8 carbon atoms.
3. The polyethylene composition according to claim 2, wherein the comonomer  
units are selected from 1-butene and 1-hexene.
4. The polyethylene composition according to any one of the preceding claims,  
wherein the weight ratio between the low molecular weight ethylene polymer  
component and the high molecular weight ethylene polymer component in the  
base resin is in the range of from 40 : 60 to 48 : 52.
5. The polyethylene composition according to any one of the preceding claims  
having at least one, preferably all of the following properties: a melt flow rate

- 48 -

MFR<sub>5</sub> (190°C, 5 kg) of from 2.0 to 3.5 g/10 min, a melt flow rate MFR<sub>21</sub> (190°C, 21.6 kg) of from 30 to 50 g/10 min and a flow rate ratio being the ratio of MFR<sub>21</sub>/MFR<sub>5</sub> of from 10 to 25.

- 5 6. The polyethylene composition according to any one of the preceding claims having at least one, preferably all of the following properties: a weight average molecular weight Mw of from 90 to 130 kg/mol, a number average molecular weight Mn of from 7 to 10 kg/mol and a z average molecular weight Mz of from 400 to 800 kg/mol.
- 10 7. The polyethylene composition according to any one of the preceding claims having a melt flow rate MFR<sub>21</sub> (190°C, 21.6 kg) of from 32 to 48 g/10 min.
8. The polyethylene composition according to any one of the preceding claims
- 15 having a number average molecular weight Mn of from 7.5 to 9.5 kg/mol.
9. The polyethylene composition according to any one of the preceding claims having a weight average molecular weight Mw of from 95 to 125 kg/mol.
- 20 10. The polyethylene composition according to any one of the preceding claims having at least one, preferably all of the following properties: a shear thinning index SHI<sub>5/200</sub> of from 8 to 18, a shear thinning index SHI<sub>2.7/210</sub> of from 10 to 20, a dynamic viscosity  $\eta_{a0.05}$  of from 10000 to 25000 Pa·s, a dynamic viscosity  $\eta_{a300}$  of from 500 to 1000 Pa·s and a viscosity at a constant shear stress of 747
- 25 Pa,  $\eta_{a747}$ , of from 10000 to 30000 Pa·s.
11. The polyethylene composition according to any one of the preceding claims having at least one, preferably all of the following properties: a tensile stress at yield of from 26 to 32 MPa, a tensile strain at yield of from 7 to 10 % and a
- 30 flexural modulus of from 1200 to 1800 MPa.

12. The polyethylene composition according to any one of the preceding claims having an environmental stress crack resistance (F50, 10% Igepal) of at least 72 hours.
- 5
13. A process for producing a polyethylene composition according to any one of the preceding claims comprising the steps of:
- a) polymerizing ethylene in the presence of a polymerization catalyst in a first polymerization reactor for producing a first intermediate material comprising the low molecular weight ethylene polymer component;
- 10
- b) transferring the first intermediate material into a second polymerization reactor;
- c) polymerizing ethylene and at least one comonomer selected from alpha-olefins having from 4 to 8 carbon atoms in the presence of the first intermediate material for producing a base resin comprising the low molecular weight ethylene polymer component and the high molecular weight ethylene polymer component;
- 15
- d) compounding the base resin to obtain the polyethylene composition.
- 20
14. An article comprising the polyethylene composition according to any one of the preceding claims.
15. The article according to claim 14 being a film or a blow molded article.
- 25
16. The article according to claims 14 or 15 being a blown film, cast film or at least one layer of a multi-layered film.
17. The article according to any one of claims 14 to 16 being a film with at least one of the following properties:

- 50 -

- Tensile modulus in machine direction (TM-MD) and in transverse direction (TM-MD) both of at least 1000 MPa;
- Elongation at break in machine direction (EB-MD) of at least 400 %;
- Elmendorf Tear Strength in transverse direction (ETS-TD) of at least 6.5 N;
- 5 - Puncture resistance energy of at least 0.50 J;
- Water vapour transmission rate at 100% RH of not more than 10 g/m<sup>2</sup>/day;
- Oxygen transmission rate of not more than 3100 cm<sup>3</sup>/m<sup>2</sup>/day; and
- not more than 35 gels/m<sup>2</sup> of 301-600 µm diameter and not more than 140 gels/m<sup>2</sup> of 100-300 µm diameter.

10

18. The use of a polyethylene composition according to any one of claims 1 to 13 for the production of a film.