## CLAIMS

1. A polymer reactor-blend comprising at least a first component having a polydispersity index of greater than about 20 and present in an amount of from about 1 wt.% to about 99 wt.% based on the total weight of the polymer and a second component having a polydispersity index of less than about 20 and present in an amount of from about 1 wt.% to about 99 wt.% based on the total weight of the polymer wherein a molecular weight distribution of the second component lies within a molecular weight distribution of the first component.

2. The polymer of claim 1 having greater than about 75 % of branching contained within the second component.

3. The polymer of claim 2 formed from ethylene and a comonomer.

4. The polymer of claim 2 wherein the first component has a density of greater than about 0.950 g/cc.

5. The polymer of claim 3 wherein the branching can be either short-chain branching, long-chain branching or both.

6. The polymer of claim 3 wherein the comonomer comprises 1-butene, 1-hexene, 1-octene, or combinations thereof.

7. The polymer of claim 2 wherein the branching comprises short-chain branching.

8. The polymer of claim 7 wherein the short-chain branching is greater than about 0.1 SCB per 1000 carbons.

9. The polymer of claim 1 having a weight average molecular weight of from about 50 kg/mol to about 1000 kg/mol.

10. The polymer of claim 1 having a molecular weight distribution of from about 4 to about 200.

11. The polymer of claim 1 having a CY-a value of from about 0.05 to about 0.8.

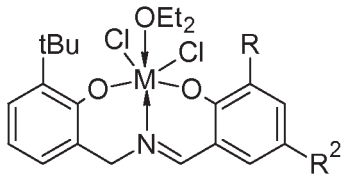
12. The polymer of claim 11 having a short-chain branching content of from about 1 to about 20 SCB per 1000 carbons.

13. The polymer of claim 8 having a tensile draw ratio of less than about 600 %.

14. The polymer of claim 8 having a PENT failure time of greater than 800 h determined in accordance with ASTM F1473 using a 3.8 MPa stress.

15. A method of preparing a polymer pipe comprising:

obtaining a polymer prepared by contacting ethylene monomer and 1-hexene with a catalyst composition comprising (i) an imine (bis) phenolate compound having Structure XIV




Structure XIV

where M is a Group 3 to Group 12 transition metal or lanthanide

$R^2$ and $R^3$ can each independently be hydrogen, a halogen, a hydrocarbyl group, or a substituted hydrocarbyl group and (ii) a metallocene complex under conditions suitable for the formation of a polymer and $Et_2O$ is optional; and

fabricating the polymer into a pipe wherein the polymer has zero shear viscosity of from about 1E+05 Pa-s to about 1E+10 Pa-s and a tensile natural draw ratio of less than about 600 % and wherein the pipe has a PENT value of greater than about 800 hours as determined in accordance with ASTM F1473 using a 3.8 MPa stress.

16. A polymer reactor blend having a polydispersity index of greater than about 15 and a short-chain branching distribution maximum that occurs between a weight average molecular weight of about 30 kDa and 1000 kDa.

17. The polymer of claim 16 having a level of short-chain branching ranging from about 0.1 to about 20 short chain branches per 1000 total carbon atoms and a short chain branching distribution that is described by a Pearson VII Amp curve fit wherein the value of the short chain branching distribution slope from the short chain branching distribution maximum at a log of the weight average molecular weight less than about the maximum log weight average molecular weight is less than about -0.005.

18. The polymer of claim 16 comprising polyethylene.

19. The polymer of claim 16 prepared using a catalyst composition comprising at least one imine (bis) phenolate compound, at least one metallocene compound, and a metal alkyl.

20. An article prepared from the polymer of claim 16.

## CLAIMS

1. A polymer reactor-blend comprising at least a first component having a polydispersity index of greater than about 20 and present in an amount of from about 1 wt.% to about 99 wt.% based on the total weight of the polymer and a second component having a polydispersity index of less than about 20 and present in an amount of from about 1 wt.% to about 99 wt.% based on the total weight of the polymer wherein a molecular weight distribution of the second component is encompassed by a molecular weight distribution of the first component and wherein the polymer has greater than about 75% of branching contained within the second component.

2. The reactor-blend of claim 1 formed from ethylene and a comonomer.

3. The reactor-blend of claim 1 wherein the first component has a density of greater than about 0.950 g/cc.

4. The reactor-blend of claim 3 wherein the branching can be either short-chain branching, long-chain branching or both.

5. The reactor-blend of claim 3 wherein the comonomer comprises 1-butene, 1-hexene, 1-octene, or combinations thereof.

6. The reactor-blend of claim 1 wherein the branching comprises short-chain branching.

7. The reactor-blend of claim 6 wherein the short-chain branching is greater than about 0.1 SCB per 1000 carbons.

8. The reactor-blend of claim 1 having a weight average molecular weight of from about 50 kg/mol to about 1000 kg/mol.

9. The reactor-blend of claim 1 having a molecular weight distribution of from about 4 to about 200

10. The reactor-blend of claim 1 having a CY-a value of from about 0.05 to about 0.8.

11. The reactor-blend of claim 10 having a short-chain branching content of from about 1 to about 20 SCB per 1000 carbons.

12. The reactor-blend of claim 7 having a tensile draw ratio of less than about 600 %.

13. The reactor-blend of claim 7 having a PENT failure time of greater than 800 h determined in accordance with ASTM F1473 using a 3.8 MPa stress.

14. The reactor-blend of claim 1 having a short-chain branching distribution described by a Pearson VII Amp curve fit.