CLAIMS

What is claimed is:

1. A process to produce a laminate comprising:

coating at least an outer surface of a dynamically vulcanized alloy film with an adhesive composition to produce the laminate, wherein the adhesive layer has a thickness of less than or equal to 10 microns, wherein the dynamically vulcanized alloy film comprises a thermoplastic elastomer composition containing a thermoplastic resin as a continuous phase, and a rubber composition dispersed therein, as a dispersed phase~~.~~; and

wherein the adhesive composition comprises a polyethyleneimine or a functionalized amino-functional polymer which is a condensation product of a reaction between an amino-functional polymer comprising reactive amine hydrogens with a functionalizing agent selected from the group consisting of a halo-functional monomer, a halo-functional oligomer, a carbonyl-functional monomer, a carbonyl-functional oligomer, an epoxy-functional monomer, an epoxy-functional oligomer, a poly-functional acrylic monomer, a poly-functional acrylic oligomer, a poly-functional methacrylic monomer, a poly-functional methacrylic oligomer, and combinations thereof

2. The process according to claim 1, wherein the dynamically vulcanized alloy film is a blown film comprising an infinite number of sides.

3. The process according to claim 1 or 2, wherein the coating of the dynamically vulcanized alloy film comprises gravure coating, reverse roll coating, knife over roll coating, metering rod coating, slot die coating, dip coating, curtain coating, air knife coating, or a combination thereof.

4. The process according to any one of claims 1 to 3, wherein the adhesive layer is deposited on the surface of the dynamically vulcanized alloy film at a rate of less than or equal to 5 g/m^2.

5. The process according to any one of claims 1 to 4, wherein the laminate has a Mocon air permeation coefficient of less than or equal to 25×10^{-12} cc cm/cm^2 sec cm Hg at 30°C.

6. The process according to any one of claims 1 to 5, wherein the adhesive layer has a Picma tack to an unvulcanized diene-based rubber of greater than or equal to 5 N/cm.

7. The process according to any one of claims 1 to 6, wherein the adhesive layer has a Picma tack to an unvulcanized diene-based rubber of greater than or equal to 10 to 50 N/cm.

8. The process according to any one of claims 1 to 7, wherein the thermoplastic resin of the continuous phase comprises a polyamide and wherein the rubber composition of the dispersed phase comprises a halogenated copolymer of isobutylene and paramethylstyrene.

9. The process according to any one of claims 1 to 8, subject to the proviso that the adhesive composition does not include an epoxidized styrene-butadiene-based block copolymer.

10. The process according to any one of claims 1 to 9, wherein the thermoplastic elastomer composition comprises plasticizer, and wherein prior to coating of the dynamically vulcanized alloy film with the adhesive composition, the thermoplastic elastomer composition is treated to reduce the amount of plasticizer present in the thermoplastic elastomer composition or on a surface thereof.

11. The process according to any one of claims 1 to 10, wherein the thermoplastic elastomer composition comprises butylbenzylsulfonamide (BBSA), poly(isobutylene succinic anhydride), or a combination thereof, and wherein prior to coating of the dynamically vulcanized alloy film with the adhesive composition, the thermoplastic elastomer composition is heated to a temperature and for a period of time sufficient to reduce the amount of BBSA, poly(isobutylene succinic anhydride), or a combination thereof, present in the thermoplastic elastomer composition relative to the amount of BBSA, poly(isobutylene succinic anhydride), or a combination thereof, present in the thermoplastic elastomer composition prior to said heating.

12. The process according to any one of claims 1 to 10, wherein the thermoplastic

elastomer composition comprises butylbenzylsulfonamide (BBSA), poly(isobutylene succinic anhydride), or a combination thereof, and wherein prior to coating of the dynamically vulcanized alloy film with the adhesive composition, the thermoplastic elastomer composition is contacted with a solvent for a period of time, and in an amount sufficient to reduce the amount of BBSA, poly(isobutylene succinic anhydride), or a combination thereof, present in the thermoplastic elastomer composition relative to the amount of BBSA, poly(isobutylene succinic anhydride), or a combination thereof, present in the thermoplastic elastomer composition prior to said contact with the solvent.

~~13. The process according to any one of claims 1 to 12, wherein the adhesive composition comprises a polyethyleneimine.~~

~~14.~~13. The process according to any one of claims 1 to ~~13~~12, wherein the adhesive composition comprises a polyethyleneimine polymer functionalized with an ethenically unsaturated moiety selected from the group consisting of acrylic, methacrylic, enamine, and a combination thereof.

~~15.~~14. The process according to any one of claims 1 to ~~14~~13, wherein the adhesive composition comprises a polyethyleneimine polymer functionalized with an ethenically unsaturated moiety selected from the group consisting of 2-hydroxy-3-chloropropylacrylate, glycidyl methacrylate, glycidyl acrylate, acetoacetoxyethyl methacrylate, and a combination thereof.

~~16. The process according to any one of claims 1 to 12, wherein the adhesive composition comprises a functionalized amino-functional polymer which is a condensation product of a reaction between an amino-functional polymer comprising reactive amine hydrogens with a functionalizing agent selected from the group consisting of a halo-functional monomer, a halo-functional oligomer, a carbonyl-functional monomer, a carbonyl-functional oligomer, an epoxy-functional monomer, an epoxy-functional oligomer, a poly-functional acrylic monomer, a poly-functional acrylic oligomer, a poly-functional methacrylic monomer, a poly-functional methacrylic oligomer, and combinations thereof.~~

~~17.~~15. The process according to any one of claims 1 to 12, wherein the adhesive composition comprises a functionalized amino-functional polymer which is a condensation product of a reaction between an amino-functional polymer comprising reactive amine hydrogens with a functionalizing agent selected from the group consisting of 2-hydroxy-3-chloropropylacrylate, glycidyl methacrylate, glycidyl acrylate, acetoacetoxyethyl methacrylate, and combinations thereof.

~~18.~~16. The process according to any one of claims 1 to ~~17~~ 15, further comprising incorporating the laminate into a tire as an innerliner.

~~19.~~17. A laminate comprising the laminate produced according to any one of claims 1 to ~~18~~ 16.

~~20.~~18. A pneumatic tire comprising the laminate of claim ~~19~~ 17.