CLAIMS

1. A method for manufacture of plasticised homopolymeric polyvinyl alcohol, the method comprising the steps of:

introducing into a mixing reactor a polyvinyl alcohol polymer comprising polyvinyl alcohol or a blend thereof having a degree of hydrolysis in the range of 93 wt% to 98 wt%;

wherein the mixing reactor comprises a blending chamber having a primary inlet, a primary outlet and at least two inter-engaging components extending between the primary inlet and primary outlet, the components being arranged to apply a shearing force to the polymer while the polymer is conveyed by the components from the inlet through a reaction zone to the outlet;

one or more secondary inlets located downstream from the primary inlet for introducing reactants comprising water as a processing aid, a plasticiser and a reactive stabiliser to the chamber to form a reaction mixture;

wherein the plasticiser is selected from the group consisting of: diglycerol, triglycerol, fructose, ribose, xylose, D-mannitol, triacetin, pentaerythritol, dipentaerythritol, methyl pentanediol, 1,2-propanediol, 1,4-butanediol, 2-hydroxy-1,3-propanediol, 3-methyl-1,3-butanediol, 3,3-dimethyl-1,2-butanediol, polyethylene glycol 300, polyethylene glycol 400, alkoxylated polyethylene glycol, caprolactam, tricyclic trimethylolpropane formal, rosin esters, erucamide, and mixtures thereof; wherein the reactive stabiliser is selected from the group consisting of:

sodium stearate, potassium oleate, sodium benzoate, calcium stearate, dimethyl propionic acid, and mixtures thereof;

wherein the blending chamber comprises a plurality of heated regions arranged so that the mixture is subjected to a temperature profile whereby the temperature increases from the inlet to the outlet;

a secondary outlet located between the reaction zone and primary outlet arranged to allow removal of processing aid from the chamber;

reacting the water, plasticiser and polymer in the reaction zone to form plasticised polymer; and

allowing the plasticised polymer to pass from the primary outlet.

2. A method as claimed in claim 1, wherein the reactive stabiliser is sodium benzoate.

3. A method as claimed in claim 1 or 2, wherein the amount of the reactive stabiliser is from 0.2 wt% to 5 wt%.

4. A method as claimed in claim 3, wherein the amount of the reactive stabiliser is from 0.5 wt% to 3 wt%.

5. A method as claimed in claim 4, wherein the amount of the reactive stabiliser is from 0.5 wt% to 2 wt%.

6. A method as claimed in claim 5, wherein the amount of reactive stabiliser is from 0.5 wt% to 1.5 wt%, preferably 1 wt%.

7. A method as claimed in any preceding claim, wherein the polyvinyl alcohol polymer comprises polyvinyl alcohol or a blend thereof wherein the polyvinyl alcohol has a degree of hydrolysis of 93wt% to less than 98wt%.

8. A method as claimed in claim 7, wherein the degree of hydrolysis is 93wt% to 97wt%.

9. A method as claimed in claim 8, wherein the degree of hydrolysis is 93wt% to 95wt%.

10. A method as claimed in any preceding claim, wherein the polyvinyl alcohol polymer is a blend of two or more polyvinyl alcohol polymers.

11. A method as claimed in claim 10, wherein the blend comprises a polymer having a molecular weight in the range 13,000 to 27,000 and a degree of polymerisation of 300-600 and a polymer having a molecular weight in the range 107,000 to 120,000 and a degree of polymerisation of 2,400 to 2,600.

12. A method as claimed in any preceding claim, wherein two or more of the following plasticisers are used in combination:

dipentaerythritol, methyl pentanediol, triacetin, 2-hydroxy-1,3-propanediol, 3,3-dimethyl-1,2-butanediol, tricyclic trimethylolpropane formal, D-mannitol, triglycerol, and xylose.

13. A method as claimed in any preceding claim, wherein the following plasticisers are used alone or in combination with each other: caprolactam, alkoxylated polyethylene glycol.

14. A plasticised polyvinyl alcohol polymer manufactured by the method of any preceding claim.