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(54) Title: LIGHTWEIGHT FILLER FOR WATERPROOFING BITUMEN MEMBRANES

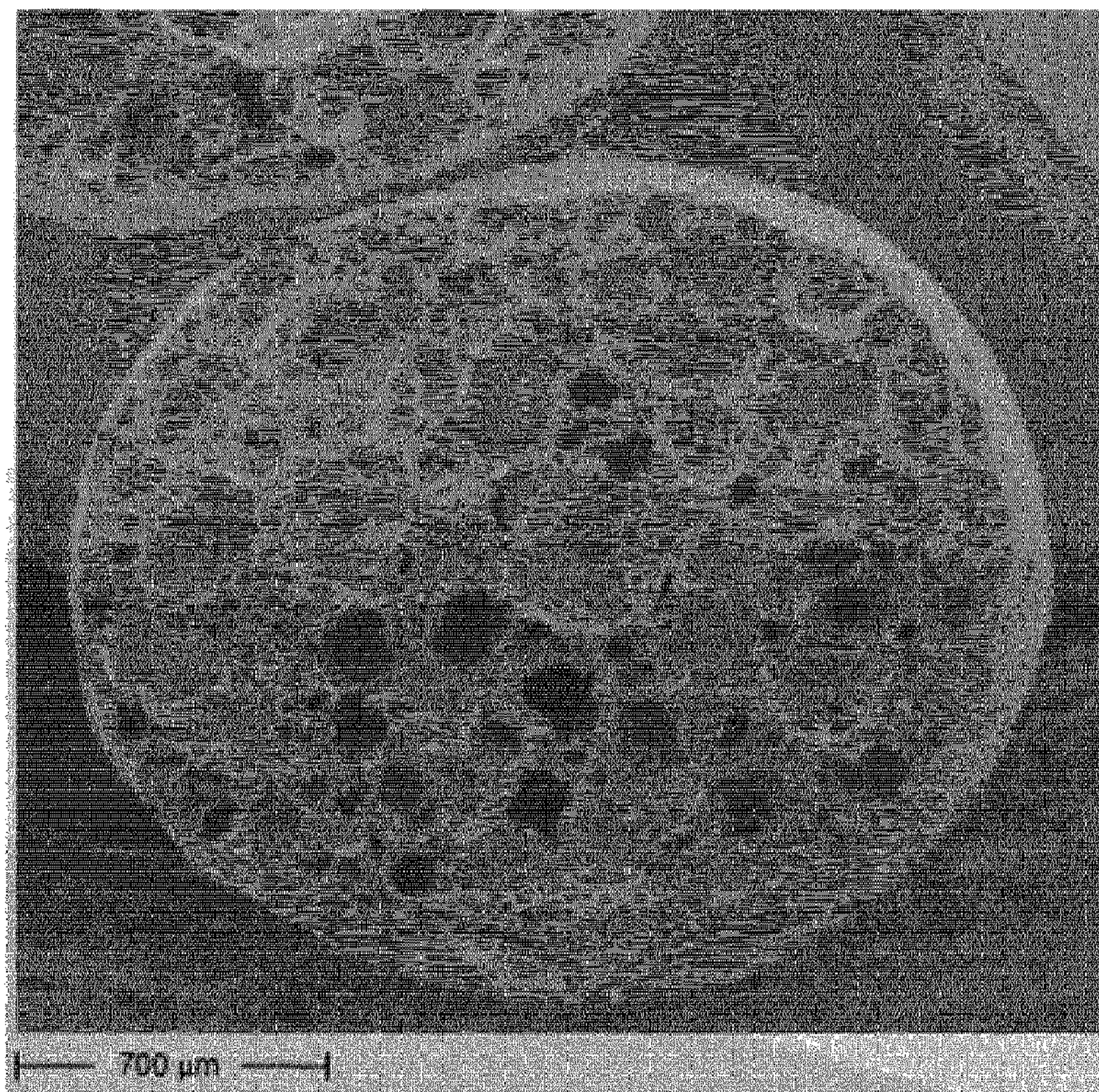


Fig. 1

(57) **Abrégé/Abstract:**

Disclosed herein is a waterproofing membrane comprising a reinforcing material coated with a blend formulation, the blend formulation comprising glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.

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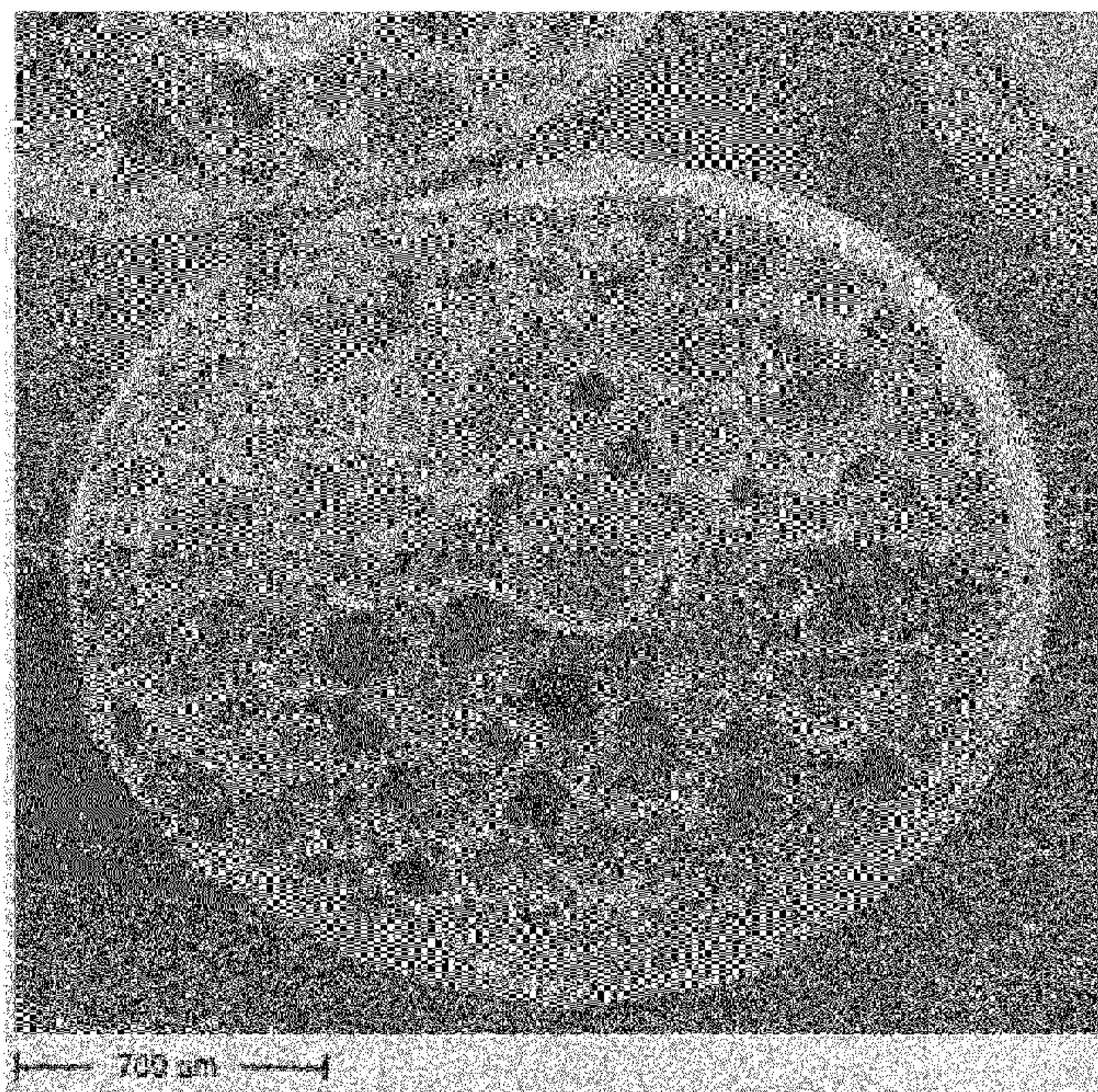


Fig. 1

(57) Abstract: Disclosed herein is a waterproofing membrane comprising a reinforcing material coated with a blend formulation, the blend formulation comprising glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.

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Claims

1. A waterproofing membrane (100) comprising a reinforcing material coated and/or impregnated with a blend formulation, wherein the reinforcing material forms a reinforcement layer (106) positioned between two layers (104, 108) comprising the blend formulation, wherein the blend formulation is coated onto a top side of the reinforcement material and/or on a bottom side of the reinforcement material and possibly impregnated into the reinforcement material and further comprising a torching foil (114) as the bottom most layer in the waterproofing membrane (100), wherein the blend formulation is solid at room temperature and comprising:
- 50-90% w/w bitumen or 50-90% w/w mix of bitumen and plasticizer;
 - 2-25% w/w elastomeric block co-polymer and/or ter-polymer and/or 2-40% w/w plastomeric block co-polymer and/or ter-polymer; and
 - 5-45% w/w glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.
2. A waterproofing membrane according to claim 1, wherein the glass spheres have a porous internal structure.
3. A waterproofing membrane according to any preceding claim, wherein the blend formulation further comprises up to 15% w/w conventional fillers.
4. A waterproofing membrane according to any preceding claim, wherein the blend formulation further comprises up to 15% w/w alternative filler.
5. A waterproofing membrane according to claim 4 wherein the alternative filler is poly(methyl methacrylate), petcoke, bedcoke, or perlite.
6. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 50-90% w/w bitumen and 0% w/w mix of bitumen and plasticizer.
7. A waterproofing membrane according to any of the preceding claims 1-4, wherein the blend formulation comprises 50-90% mix of bitumen and plasticizer.

8. A waterproofing membrane according to any of the preceding claims 1-4,
wherein the blend formulation comprises 60-80% w/w bitumen or 60-80% w/w
mix of bitumen and plasticizer.
- 5
9. A waterproofing membrane according to claim 8, wherein the blend formulation
comprises 60-80% w/w bitumen and 0% w/w mix of bitumen and plasticizer.
- 10
10. A waterproofing membrane according to claim 8, wherein the blend formulation
comprises 60-80% w/w mix of bitumen and plasticizer.
11. A waterproofing membrane according to any of the preceding claims 1-4,
wherein the blend formulation comprises 65-75% w/w bitumen or 65-75% w/w
mix of bitumen and plasticizer.
- 15
12. A waterproofing membrane according to claim 11, wherein the blend
formulation comprises 65-75% w/w bitumen and 0% w/w mix of bitumen and
plasticizer.
- 20
13. A waterproofing membrane according to claim 11, wherein the blend
formulation comprises 65-75% w/w mix of bitumen and plasticizer.
14. A waterproofing membrane according to any of the preceding claims 1-4,
wherein the blend formulation comprises 70-75% w/w bitumen or 70-75% w/w
mix of bitumen and plasticizer.
- 25
15. A waterproofing membrane according to claim 14, wherein the blend
formulation comprises 70-75% w/w bitumen and 0% w/w mix of bitumen and
plasticizer.
- 30
16. A waterproofing membrane according to claim 14, wherein the blend
formulation comprises 70-75% w/w mix of bitumen and plasticizer.

17. A waterproofing membrane according to any preceding claim, wherein the bitumen is distilled grades or air blown bitumen.
- 5 18. A waterproofing membrane according to any preceding claim, wherein the elastomeric block co-polymer and/or ter-polymer belongs to the group of Styrene-Butadiene-Styrene (SBS), Styrene-Isoprene-Styrene (SIS), Styrene-Ethylene-Butadiene-Styrene (SEBS), Styrene-Butadiene (SB) and mixtures thereof.
- 10 19. A waterproofing membrane according to any preceding claim, wherein the plastomeric block co-polymer and/or ter-polymer belongs to the group of low-density polyethylene, high-density polyethylene, atactic polypropylene, amorphous polyalphaolefin, isotactic polypropylene, ethylene/propylene copolymer, liquid low molecular polymer, ethylene/propylene/(poly)butene
15 terpolymer and mixtures thereof.
- 20 20. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 2-25% w/w elastomeric block co-polymer and/or ter-polymer and/or 2-40% w/w plastomeric co-polymer and/or ter-polymer, or 5-
20 20% w/w elastomeric block co-polymer and/or ter-polymer and/or 5-35% w/w plastomeric co-polymer and/or ter-polymer, or 8-12% w/w elastomeric block polymer and/or 8-30% w/w plastomeric co-polymer and/or ter-polymer.
- 25 21. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 10-40% w/w glass spheres.
22. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 10-35% w/w glass spheres.
- 30 23. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 10-30% w/w glass spheres.
24. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 10-25% w/w glass spheres.

25. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 12-20% w/w glass spheres.
- 5 26. A waterproofing membrane according to any preceding claim, wherein the blend formulation comprises 15-17% w/w glass spheres.
27. A waterproofing membrane according to any preceding claim, wherein the elastomeric block co-polymer and/or ter-polymer is Styrene-Butadiene-Styrene.
- 10
28. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a softening point of at least 70 °C at fresh state.
- 15 29. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a softening point of at least 80 °C at fresh state.
30. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a softening point of at least 90 °C at fresh state.
- 20
31. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a softening point of at least 100 °C at fresh state.
32. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a softening point between 70 and 175 °C at fresh state.
- 25
33. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a cold bending property of -20 °C or lower at fresh state.
- 30 34. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a cold bending property between -20 °C and -40 °C at fresh state.

35. A waterproofing membrane according to any preceding claim, wherein the blend formulation has a density of 0.8-1.2 g/cm³, and wherein the blend formulation comprises 2-25% w/w elastomeric block co-polymer and/or ter-polymer.
- 5 36. A waterproofing membrane according to any preceding claim, wherein the waterproofing membrane has a density of 800-1200 g/m² per mm of waterproofing membrane thickness, and wherein the blend formulation comprises 2-25% w/w elastomeric block co-polymer and/or ter-polymer.
- 10 37. A waterproofing membrane according to any of the preceding claim, wherein the blend formulation has a density of 0.85-1.0 g/cm³, and wherein the blend formulation comprises 2-40% w/w plastomeric block co-polymer and/or ter-polymer.
- 15 38. A waterproofing membrane according to any of the preceding claim, wherein the waterproofing membrane has a density of 850-1000 g/m² per mm of waterproofing membrane thickness, and wherein the blend formulation comprises 2-40% w/w plastomeric block co-polymer and/or ter-polymer.
- 20 39. A waterproofing membrane according to any preceding claim, wherein the blend formulation is impregnated into the reinforcement material.
40. A waterproofing membrane according to any preceding claim, wherein the blend formulation is coated onto the top side of the reinforcement material and on the
25 bottom side of the reinforcement material.
41. A waterproofing membrane according to any preceding claim, wherein the blend formulation on the top side of the reinforcement material is different from that on the bottom side of the reinforcement material and/or the blend formulation
30 impregnated into the reinforcement material.
42. A waterproofing membrane according to claim 41, wherein all blend formulations comprises:
- 50-90% w/w bitumen or 50-90% w/w mix of bitumen and plasticizer;

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- 2-25% w/w elastomeric block co-polymer and/or ter-polymer and/or 2-40% w/w plastomeric block co-polymer and/or ter-polymer; and
- 5-45% w/w glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.

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43. A waterproofing membrane according to claim **Fehler! Verweisquelle konnte nicht gefunden werden.** further comprising a torching layer (112) positioned between the torching foil (114) and the blend formulation layer (108) coated onto the bottom side of the reinforcement layer (106).

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44. A waterproofing membrane according to claim 43 further comprising a separation layer (110) positioned between the torching layer (112) and the blend formulation layer (108) coated onto the bottom side of the reinforcement layer (106), wherein the reinforcement layer (106) is possibly coated and/or impregnated with the blend formulation on the bottom side.

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45. A waterproofing membrane according to claim 44, wherein the separation layer (110) is a sand layer.

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46. A waterproofing membrane according to any preceding claim further comprising a layer (102) of granules or slate positioned as the top most layer in the waterproofing membrane (100).

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47. Use of a blend formulation in the production of a waterproofing membrane according to claims 1 to 46, the blend formulation is solid at room temperature and comprising:

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- 50-90% w/w bitumen or 50-90% w/w mix of bitumen and plasticizer;
- 2-25% w/w elastomeric block co-polymer and/or ter-polymer and/or 2-40% w/w plastomeric block co-polymer and/or ter-polymer; and
- 5-45% w/w glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.

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48. A blend formulation for use in the production of a waterproofing membrane according to the claims 1 to 46, the blend formulation is solid at room temperature and comprising:

- 50-90% w/w bitumen and 50-90% w/w mix of bitumen and plasticizer;
- 5 • 2-25% w/w elastomeric block co-polymer and/or ter-polymer and/or 2-40% w/w plastomeric block co-polymer and/or ter-polymer; and
- 5-45% w/w glass spheres having a particle size between 0.25-0.50 mm and a particle density between 0.5-0.8 g/cm³.

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