CLAIMS

1. A vapor-permeable shoe (10, 100, 100a, 200) with waterproof and vapor-permeable sole, comprising

– an upper assembly (11),

– a sole (12), which is joined to said upper assembly (11) and comprises a body (13) made of waterproof material which has a tread (14) and has at least one region (15) that is permeable to water vapor,

– at least one waterproof and vapor-permeable membrane (16), which covers said at least one region (15), toward the inside of said shoe (10, 100, 100a, 200),

– at least one protective element (17), which covers at least partially the lower face (16a) of said at least one membrane (16), whereby

said shoe (10, 100, 100a, 200) comprises at least one protective shield (18) which is vapor-permeable, covers said at least one region (15) and is substantially interposed between said region and said at least one protective element (17), said protective shield (18) being sealed in a waterproof manner to said body (13) at at least one zone (13a) of said body (13) that is peripheral to said at least one region (15) wherein a peripheral portion (16b) of said at least one membrane (16) is sealed impermeably to said body (13), said shoe being characterized in that said protective shield (18) is waterproof.

2. The shoe according to claim 1, characterized in that a permeable spacer (20) is superimposed at least partially on said membrane (16) in order to protect it.

3. The shoe according to claims 1 or 2, characterized in that said at least one protective shield (18) is microporous and has pores with an average aperture of less than 1 μm.

4. The shoe according to any one of claims 1 to 3, characterized in that said at least one protective shield (18) comprises a sheet made of material obtained from a substantially uniform mixture composed of

– a polyolefin with high molecular weight, in a percentage concentration of the volume of said mixture comprised between 8% and 98%,

– a filler, which is adapted to promote the formation of micropores, in a percentage concentration of the volume of said mixture comprised between 1% and 92%,

– a plasticizer, in a percentage concentration of the volume of said mixture comprised between 1% and 40%.

5. The shoe according to claim 4, characterized in that said polyolefin is a UHMW polyethylene (UHMW meaning Ultra High Molecular Weight).

6. The shoe according to claims 4 or 5, characterized in that said filler is selected between silicon dioxide and silicic acid, said plasticizer being a water-insoluble oil.

7. The shoe according to claim 1, characterized in that said at least one protective shield (18) is made of a material selected among polytetrafluoroethylene, polyurethane, polyester, polypropylene, polyethylene and the like.

8. The shoe according to claim 7, characterized in that said at least one protective shield (18) has a structure selected among

– a structure constituted by a single integral layer having a thickness substantially comprised between 0.1 and 5.0 mm,

– a structure constituted by a plurality of layers joined by lamination to form a multilayer element whose thickness is substantially comprised between 0.1 and 5.0 mm,

– a structure constituted by a plurality of laminated layers, a permeable material being provided between them and being cohesive with them.

9. The shoe according to any one claims 1 to 8, characterized in that said at least one protective shield (18) is sealed impermeably to said body (13), at said at least one zone (13a) of said body (13), which is peripheral with respect to said at least one region (15), by adhesive bonding.

10. The shoe according to any one of claims 1 to 9, characterized in that the material that forms at least one component of said body (13) is co-molded on said at least one protective shield (18) so as to grip it and form a waterproof seal at said at least one zone (13a) of said body (13), which is peripheral to said at least one region (15).

11. The shoe according to any one of claims 1 to 10, characterized in that it comprises a lower portion (21) and an upper portion (22) of the body (13), said at least one protective shield (18) being sealed to said lower portion (21) which has said at least one zone (13a) which is peripheral to said at least one region (15).

12. The shoe according to claim 11, characterized in that said protective shield (18) has a perimetric band (18a), which is exposed by said protective element (17) and by said membrane (16), said protective shield (18), at said perimetric band (18a), being associated so as to provide a waterproof seal with said upper portion (22).

13. The shoe according to claims 11 or 12, characterized in that said upper portion (22) has a central portion that has through openings or holes that form part of said region (15).

14. The shoe according to any one of claims 1 to 13, characterized in that the upper assembly (11) comprises at least one outer vapor-permeable upper (23), a vapor-permeable lining (24) and a vapor-permeable insole (25), which comprises said membrane (16), the lower flaps of said at least one upper (23) and of said at least one lining (24) being joined to said insole (25), said body (13) being further connected so as to provide a waterproof seal

– in a downward region to said peripheral portion (16b) of said at least one membrane (16), and

– to said at least one protective shield (18) at said zone (13a), which is peripheral to said region (15) that is permeable to water vapor.