

CLAIMS

1. A pressure sensing device comprising,
a plurality of chambers for storing one or more visual indicators,
5 wherein the plurality of chambers are configured to release the one or
more visual indicators when a pressure exerted on the plurality of chambers
exceeds one or more pressure thresholds.
2. The device according to claim 1, wherein the plurality of chambers
10 comprise,
a first subset of chambers configured to be collapsible to release a first
visual indicator contained therein, when the pressure exerted on the plurality of
chambers exceeds a first pressure threshold,
a second subset of chambers configured to be collapsible to release a
15 second visual indicator contained therein, when the pressure exerted on the
plurality of chambers exceeds a second pressure threshold,
wherein the second pressure threshold is higher than the first pressure
threshold.
- 20 3. The device according to claim 2, further comprising,
a first visual indicator stored within the first subset of chambers; and
a second visual indicator stored within the second subset of chambers,
wherein the release of only the first visual indicator indicates that the
pressure exerted on the plurality of chambers is between the first and second
25 pressure thresholds, and
wherein the release of both the first and second visual indicators indicates
that the pressure exerted on the plurality of chambers is above the second
pressure threshold.
- 30 4. The device according to claim 2 or 3,

wherein the first pressure threshold is set at a level between 15 mmHg to 25 mmHg, and the second pressure threshold is set at a level between 25 mmHg to 45 mmHg.

5 5. The device according to any one of claims 1 to 4, wherein the second pressure threshold is at least 10 mmHg higher than the first pressure threshold.

10 6. The device according to any one of claims 1 to 5, wherein the pressure exerted on the plurality of chambers is a compressive pressure.

7. The device according to any one of claims 1 to 6, wherein the plurality of chambers comprise walls having a thickness of from 1 μ m to 10 μ m.

15 8. The device according to any one of claims 1 to 7, wherein the plurality of chambers is formed by a film comprising a single layer of polymer.

9. The device according to any one of claims 1 to 7, wherein the plurality of chambers is formed by a film comprising alternating complementary layers of polymers,

wherein at least one alternating layer comprises polyanionic material selected from the group consisting of gum arabic, anionic polysaccharide, alginate, pectin, agar, carrageenan, polyacrylate, poly(4-styrenesulphonates), poly(vinylsulphonates), polyanetholesulphonates and combinations thereof; and

25 wherein at least another alternating layer comprises polycationic material selected from the group consisting of gelatin, chitosan, whey proteins, albumin, beta- lactoglobulin, potato proteins, fava, legumin, soybean proteins, natural or synthetic polysaccharides, chitosan, poly(allylammmonium), poly(diallyldimethylammonium), poly(ethyleneimine) (PEI), poly(L-lysine) (PLL),
30 poly(histidine), heparin, heparan sulfate, chondroitin sulfate, dextran sulfate, oxidized cellulose, polyaspartic acid, polyglutamic acid and combinations thereof.

10. The device according to claim 9, wherein the film comprises at least 10 layers of polymers.

11. The device according to any one of claims 1 to 10, wherein the
5 plurality of chambers is sealed by a support layer to prevent and/or minimise leakage of the one or more visual indicators from said chambers.

12. A method of making a pressure sensing device, the method comprising,
10 forming a film comprising a plurality of chambers for storing one or more visual indicators,
wherein the plurality of chambers are configured to release the one or more visual indicators when a pressure exerted on the plurality of chambers exceeds one or more pressure thresholds.

15 13. The method according to claim 12, further comprising, prior to forming the film, fabricating a pattern template comprising a plurality of wells, wherein said plurality of wells is a template for the plurality of chambers.

20 14. The method according to claim 12 or 13, wherein the step of forming the film comprises depositing a polymeric material on the pattern template to form a single layer of polymer, or depositing two or more polymeric materials in an alternating manner to form alternating layers of complementary polymers.

25 15. The method according to any one of claims 12 to 14, wherein the step of forming the film comprises forming a plurality of chambers with walls having a thickness of from 1 μm to 10 μm .

30 16. The method according to any one of claims 12 to 15, further comprising applying a support layer to the film to prevent and/or minimise leakage of the one or more visual indicators from the plurality of chambers.

17. The method according to any one of claims 12 to 16, further comprising loading one or more visual indicators into the plurality of chambers using an ink-jet printer or a solvent exchange technique.

5 18. A bandaging system comprising,
one or more pressure sensing devices as defined in any one of claims 1 to 11.

10 19. The bandaging system according to claim 18, further comprising a
primary bandaging layer for covering a site of interest, wherein the one or more pressure sensing devices are arranged to be positioned on the primary bandaging layer.

15 20. The bandaging system according to claim 19, further comprising
one or more secondary bandaging layers for exerting pressure on the site of interest, wherein the one or more secondary bandaging layers are arranged to cover the one or more pressure sensing devices positioned on the primary bandaging layer.

20 21. The bandaging system according to claim 20, wherein the one or
more visual indicators are arranged to penetrate the one or more secondary bandaging layers to form one or more visually observable markings thereon when they are released from the plurality of chambers.

25 22. A method of detecting applied pressure, the method comprising,
positioning one or more pressure sensing devices as defined in any one of claims 1 to 11 on a site of interest,
applying pressure on the site of interest, and
detecting one or more visually observable signals formed by the one or
30 more visual indicators released from the plurality of chambers.

23. The method according to claim 22, wherein the step of applying pressure comprises,

increasing pressure on the site of interest until release of a first visual indicator is detected but before release of a second visual indicator is detected,
5 indicating that the pressure applied on the site of interest exceeds a first pressure threshold but not a second pressure threshold.

24. The method according to claim 22 or 23, further comprising, prior to positioning the one or more pressure sensing devices, covering the site of
10 interest with a primary bandaging layer.

25. The method according to claim 24, further comprising applying one or more secondary bandaging layers for exerting pressure on the site of interest, wherein the one or more secondary bandaging layers are arranged to cover the
15 one or more pressure sensing devices positioned on the primary bandaging layer.

26. The method according to claim 25, wherein detection of the release of one or more visual indicators is through one or more visually observable signals formed on the one or more secondary bandaging layers.