

CLAIMS

1. A wound dressing for pressure gradient wound therapy, the wound dressing comprising:
 - an adhesive layer comprising an adhesive region for providing a seal
5 between the wound dressing and the periphery of a wound site;
wherein the adhesive layer comprises one or more sensors associated with the adhesive region, configured to monitor one or more conditions indicative of a hermeticity of the seal between the wound dressing and the periphery of the wound site.
- 10 2. A wound dressing as claimed in claim 1, wherein the one or more sensors comprise a micro-electromechanical system (MEMS) sensor or a nano-electromechanical system (NEMS) sensor.
3. A wound dressing as claimed in claim 1 or claim 2, wherein the one or more sensors comprise a plurality of sensors.
- 15 4. A wound dressing as claimed in claim 3, wherein the plurality of sensors are arranged as a strip of sensors.
5. A wound dressing as claimed in claim 4, wherein the plurality of sensors are arranged in a strip which is configured to be provided about at least part of wound site, or is configured to substantially surround the wound site, in use.
- 20 6. A wound dressing as claimed in any of claims 1 to 5, wherein the one or more sensors are incorporated on, within or are otherwise associated with the adhesive region.
7. A wound dressing as claimed in claim 6, wherein the one or more sensors are embedded within the adhesive region.
- 25 8. A wound dressing as claimed in claim 6, wherein the one or more sensors are configured to be positioned between the wound dressing and the periphery of the wound site, in use.
9. A wound dressing as claimed in any preceding claim, wherein the one or more sensors comprise a pressure sensor, operable to obtain a measurement indicative
30 of a pressure associated with the wound dressing.

10. A wound dressing as claimed in claim 9, wherein the one or more pressure sensors are operable to obtain a measurement indicative of a pressure associated with the seal between the adhesive region and the periphery of the wound site.
11. A wound dressing as claimed in claim 10, wherein the pressure associated with
5 the seal between the adhesive region and the periphery of the wound site comprises an average pressure value determined by two or more pressure sensors.
12. A wound dressing as claimed in any preceding claim, wherein the one or more
10 sensors comprise a temperature sensor, operable to obtain a measurement indicative of the temperature associated with the wound dressing.
13. A wound dressing as claimed in claim 11, wherein the one or more sensors are operable to obtain a measurement of a temperature gradient associated within the wound dressing.
14. A wound dressing as claimed in any preceding claim, wherein the one or more
15 sensors comprise an optical sensor, wherein a light intensity level or frequency content of light measured by the one or more optical sensors is indicative of a level of hermeticity between the wound dressing and the periphery of the wound site.
15. A wound dressing as claimed in any preceding claim, wherein the one or more
20 sensors comprise an airflow sensor.
16. A wound dressing as claimed in claim 15, wherein the one or more airflow sensors are operable to determine a measurement indicative of a speed and/or direction of airflow across the sensor(s).
17. A wound dressing as claimed in any preceding claim, wherein the one or more
25 sensors are operable to output a signal indicative of the one or more monitored conditions for determining the hermeticity of the seal between the wound dressing and the periphery of the wound site, wherein the is output via either a wired or wireless connection with a controller, and wherein the controller is operable to determine the hermeticity of the seal between the wound dressing
30 and the periphery of the wound site in dependence on the signal(s) received via such connection from the one or more sensors.

18. A wound dressing as claimed in any preceding claim comprising one or more indicators operable to provide an indication to a user of the wound dressing in dependence on the one or more conditions monitored by the one or more sensors.
- 5 19. A wound dressing as claimed in claim 18, wherein the one or more indicators comprise a visual indicator.
20. A wound dressing as claimed in claim 18 or claim 19, wherein the one or more indicators comprise an audible indicator.
21. A wound dressing as claimed in any of claims 18 to 20, wherein the one or more
10 indicators are configured to be positioned, in use, about the periphery of the wound site.
22. A wound dressing as claimed in claim 21, wherein the one or more indicators are configured to provide an indication at or proximal to the location of an area of reduced hermeticity in dependence on the one or more conditions monitored
15 by the one or more sensors.
23. A pressure gradient wound therapy apparatus, comprising the wound dressing of any of claims 1 to 22, and a pump assembly for providing a source of positive or negative pressure to the wound dressing, in use.
24. A pressure gradient wound therapy apparatus according to claim 23 comprising
20 a controller, wherein the one or more sensors are operable to output a signal indicative of the one or more monitored conditions to the controller for determining the hermeticity of the seal between the wound dressing and the periphery of the wound site.
25. A pressure gradient wound therapy apparatus according to claim 24 wherein the
25 one or more sensors comprise an electrical output, the controller comprises an electrical input; and the controller is operable to determine the hermeticity of the seal between the wound dressing and the periphery of the wound site in response to a signal, or signals from the one or more sensors.
26. A pressure gradient wound therapy apparatus according to claim 24 or 25
30 wherein the one or more sensors are configured such that the signal indicative of the one or more monitored conditions is output via either a wired or wireless connection with the controller, the controller being operable to determine the

hermeticity of the seal between the wound dressing and the periphery of the wound site in dependence on the signal(s) received via such connection from the one or more sensors.

27. A control system for controlling operation of a pressure gradient wound therapy apparatus of any of claims 23 to 26, the control system comprising one or more controllers, and being configured to: receive an input signal from at least one sensor of the wound dressing indicative of the monitored one or more conditions; and output a control signal for controlling operation of the pressure gradient wound therapy apparatus in dependence on the one or more conditions.
28. A control system according to claim 27 configured to determine a hermeticity of the seal between the wound dressing and the periphery of the wound site in dependence on the one or more conditions.
29. A control system according to claim 27 or 28 which is configured to output a control signal for controlling operation of one or more indicators in dependence on the one or more conditions for providing an indication to a user of the wound dressing indicative of the hermeticity of the seal between the wound dressing and the periphery of the wound site; the control system being operable to output a control signal to one or more indicators provided at or proximal to the location of an area of reduced hermeticity to direct a user to the location of an area or region of reduced hermeticity between the wound dressing and the periphery of the wound site; the location corresponding to a specific area or region of the seal provided between the wound dressing and the user's skin about the periphery of the wound site.
30. A method of controlling operation of the pressure gradient wound therapy apparatus of any of claims claim 23 to 26, the method comprising: obtaining a measurement of one or more conditions indicative of a hermeticity of the seal between the wound dressing and the periphery of the wound site using the one or more sensors; and controlling operation of the pressure gradient wound therapy apparatus in dependence on the one or more conditions.