

CLAIMS

1. A filter for an apparatus for delivering a flow of gas, the filter comprising:

a filter body, wherein the filter body has a main compartment and a sub-compartment at least partly within the main compartment, wherein the main
5 compartment is in fluid communication with a main compartment gases inlet and the sub-compartment is in fluid communication with a sub-compartment gases inlet; and

a filter medium associated with both the main compartment and the sub-compartment, and that is arranged to filter gases in, or exiting, the main
10 compartment and the sub-compartment.
2. A filter according to claim 1, wherein the filter is a filter module that is removably and sealably engageable with a housing of an apparatus for delivering a flow of gas.
3. A filter according to claim 2, comprising seal(s) about an external periphery
15 of the filter to sealingly engage the filter in the housing of the apparatus.
4. A filter according to claim 3, wherein the seal(s) comprise(s) O-ring(s) or integrally formed 'wiper' seal(s).
5. A filter according to any one of claims 1 to 4, wherein the main
20 compartment is defined by at least one main compartment wall bounding a main compartment volume.
6. A filter according to claim 5, wherein the sub-compartment is defined by at least one sub-compartment wall bounding a sub-compartment volume at least partly within the main compartment volume.
7. A filter according to any one of claims 1 to 6, comprising a second sub-
25 compartment at least partly within the main compartment, wherein the second sub-compartment is arranged to receive gas from a second sub-compartment gases inlet.
8. A filter according to any one of claims 1 to 7, wherein the filter medium comprises substantially a same material as the filter body.

9. A filter according to claim 8, wherein the filter body comprises polypropylene material or other suitable polymeric material, and wherein the filter medium comprises spun polypropylene, other suitable polymeric or synthetic material(s), and/or wool fibres.
- 5 10. A filter according to any one of claims 6 to 9 when dependent on claim 1 or 2, wherein the filter medium is ultrasonically welded to the at least one main compartment wall and the at least one sub-compartment wall.
11. A filter according to any one of claims 1 to 10, comprising a filter top panel that is attached or attachable to the filter body.
- 10 12. A filter according to claim 11, wherein the filter top panel is attachable to the filter body by way of a snap fit.
13. A filter according to claim 11 or 12, wherein the filter top panel is arranged to be substantially flush with a housing of the apparatus for delivering a flow of gas, when the filter is engaged with the housing.
- 15 14. A filter according to any one of claims 1 to 13, comprising a second sub-compartment at least partly within the main compartment, wherein the second sub-compartment is arranged to receive gas from a second sub-compartment gases inlet, and wherein a duct is provided in fluid communication with the second sub-compartment.
- 20 15. A filter according to claim 14, wherein the duct is integrally formed with the filter body or is separately formed from the filter body.
16. A filter for an apparatus for delivering a flow of gas, the filter comprising:
a filter body, wherein the filter body has a main compartment that is in fluid communication with a main compartment gases inlet and a main compartment
25 gases outlet, wherein the main compartment gases outlet is substantially planar and is spanned by a filter medium, and wherein the main compartment gases inlet and main compartment gases outlet are arranged such that a gas flow direction through the inlet is offset from a gas flow direction through the outlet.

17. A filter according to claim 16, wherein the gas flow direction through the main compartment gases inlet is substantially perpendicular to the gas flow direction through the main compartment gases outlet.
18. A filter according to claim 16 or 17, wherein the main compartment is
5 substantially rectangular in profile.
19. A filter according to any one of claims 16 to 18, wherein at least a portion of the main compartment tapers inwardly such that a portion of the main compartment spaced further from the main compartment gases inlet has a smaller dimension than a portion of the main compartment adjacent the main compartment
10 gases inlet.
20. A filter according to any one of claims 16 to 19, wherein at least a portion of the main compartment tapers outwardly such that a portion of the main compartment spaced further from the main compartment gases inlet has a larger dimension than a portion of the main compartment adjacent the main compartment
15 gases inlet.
21. A filter according to any one of claims 16 to 20, wherein the filter body comprises a sub-compartment at least partly within the main compartment and that is in fluid communication with a sub-compartment gases inlet.
22. A filter according to claim 21, wherein the sub-compartment comprises a
20 sub-compartment gases outlet, and wherein the filter medium spans the sub-compartment gases outlet.
23. A filter according to claim 16, wherein the gas flow direction through the sub-compartment gases inlet is substantially perpendicular to the gas flow direction through the sub-compartment gases outlet.
24. A filter according to any one of claims 21 to 23, wherein at least a portion of
25 the sub-compartment tapers inwardly.
25. A filter according to any one of claims 21 to 24, comprising a second sub-compartment at least partly within the main compartment, wherein the second sub-compartment is arranged to receive gas from a second sub-compartment gases
30 inlet.

26. A filter according to claim 25, wherein the second sub-compartment comprises a second sub-compartment gases outlet, and wherein the filter medium spans the second sub-compartment gases outlet.
27. A filter according to claim 25, wherein the gas flow direction through the second sub-compartment gases inlet is substantially perpendicular to the gas flow direction through the second sub-compartment gases outlet.
28. A filter according to any one of claims 25 to 27, wherein at least a portion of the second sub-compartment tapers inwardly such that a portion of the second sub-compartment spaced further from the second sub-compartment gases inlet has a smaller dimension than a portion of the main compartment adjacent the second sub-compartment gases inlet.
29. An apparatus for delivering a flow of gas, the filter comprising:
- a filter body, the filter body having a compartment, a compartment filter medium associated with the compartment that is arranged to filter gases in, or exiting, the compartment;
 - an outlet filter medium associated with a gases outlet, to prevent, or at least substantially inhibit particulates from inadvertently entering the filter from the outlet;
 - wherein one of the filter compartment medium and the outlet filter medium are downstream of the other of the filter compartment medium and the outlet filter medium.
30. An apparatus for delivering a flow of gas, comprising:
- a housing with a gases outlet for delivering a flow of gas to a patient; and
 - a first gases inlet, a second gases inlet, and an ambient air inlet.
31. An apparatus according to claim 30, comprising a filter to filter gases that have been received from the first gases inlet, the second gases inlet, and the ambient air inlet.

32. An apparatus according to claim 31, comprising a blower arranged to receive gases from the filter and to deliver the gases to a gases outlet.
33. An apparatus according to claim 31 or 32, comprising a flow control valve arranged to receive gas from the first gases inlet and to deliver the gas to the filter.
- 5 34. An apparatus according to claim 33, comprising a valve module that is removably engageable with the housing, wherein the valve module comprises the valve and a valve manifold to receive gas from the valve, wherein the valve manifold has a valve manifold gases outlet that is arranged to deliver the gas from the flow control valve to the filter.
- 10 35. An apparatus according to claim 34, wherein the valve module comprises a valve carrier that substantially contains and supports the valve and the valve manifold.
36. An apparatus according to claim 35, wherein the ambient air inlet is provided in the valve carrier.
- 15 37. An apparatus according to any one of claims 34 to 36, wherein the valve module is arranged to directly couple with the filter to provide a gas flow path from the valve module to the filter.
38. An apparatus according to any one of claims 34 to 37, wherein the first gases inlet is arranged to move relative to the housing.
- 20 39. An apparatus according to any one of claims 31 to 38, wherein the filter is removably engageable with the housing.
40. An apparatus according to any one of claims 30 to 39, wherein the apparatus is a nasal high flow therapy apparatus.
41. A valve module for an apparatus for delivering a flow of gas, the valve
25 module comprising:
- a flow control valve, wherein the valve is arranged to control a flow of gas,
- an ambient air flow path passing through the valve module.

42. A valve module according to claim 41, wherein the ambient air flow path has an ambient air outlet for delivering ambient air to other components of the apparatus for delivering a flow of gas.
43. A valve module according to claim 42, wherein the ambient air outlet is
5 adapted to deliver ambient air to a filter module.
44. A valve module according to claim 42 or 43, wherein the ambient air flow path is adapted to deliver ambient air such that it flows past one or more temperature sensors of the apparatus for delivering a flow of gas.
45. A valve module according to any one of claims 41 to 44, wherein the
10 ambient air flow path passes near or adjacent to the valve.
46. A valve module according to any one of claims 41 to 45, comprising a valve manifold with a valve manifold gases inlet and a valve manifold gases outlet.
47. A valve module according to claim 46, wherein the valve is sealingly engaged with the valve manifold.
- 15 48. A valve module according to claim 46 or 47, wherein the valve is arranged to control a flow of gas from the valve manifold gases inlet to the valve manifold gases outlet.
49. A valve module according to any one of claims 46 to 48, wherein the valve manifold has a shape that is complementary to the shape of the valve.
- 20 50. A valve module according to claim 49, wherein the valve manifold has a substantially cylindrical body, and wherein the valve has a substantially cylindrical body.
51. A valve module according to any one of claims 46 to 50, wherein the valve manifold gases outlet is radially located on the valve manifold.
- 25 52. A valve module according to claim 51, wherein the valve manifold valve manifold comprises a plurality of gases outlets that are radially located about the valve manifold.

53. A valve module according to any one of claims 46 to 52, comprising a valve carrier that substantially contains and supports the valve and the valve manifold.
54. A valve module according to claim 53, wherein the valve carrier comprises supporting structure to support the valve and valve manifold.
- 5 55. A valve module according to claim 53 or 54, wherein the valve carrier comprises a speaker housing and an audio speaker located in the speaker housing.
56. A valve module according to any one of claims 53 to 55, comprising one or more sensors on or in the valve carrier.
57. A valve module according to any one of claims 53 to 56, wherein the valve
10 carrier comprises a first valve carrier part and a second valve carrier part, wherein the valve and valve manifold are secured in place at least partly between the first valve carrier part and the second valve carrier part.
58. A valve module according to any one of claims 53 to 57, wherein the valve carrier comprises one or more guards.
- 15 59. A valve module according to any one of claims 41 to 58, comprising an electrical connector to provide an electrical connection between the valve module and one or more of the other components of the apparatus for delivering a flow of gas.
60. A valve module according to claim 59, wherein the electrical connector
20 comprises a flexible printed circuit board.
61. A valve module according to any one of claims 53 to 60, wherein the valve carrier comprises flow guiding structure, wherein the flow guiding structure is arranged to direct gas flow from the valve manifold gases outlet(s) toward a filter when the valve module is removably engaged with the housing.
- 25 62. A valve module according to any one of claims 46 to 61, comprising a connector with a gases inlet, wherein the gases inlet of the connector is fluidly connectable to a gas supply line, and wherein the connector is arranged to provide a fluid connection between the gas supply line and the gases inlet of the valve manifold, and wherein the gases inlet is movable relative to the valve manifold.

63. A valve module according to claim 62, wherein the connector is a swivel connector, wherein the gases inlet is oriented substantially transversely relative to a longitudinal axis of the valve manifold, and wherein the gases inlet of the swivel connector is arranged to rotate about a longitudinal axis of the valve manifold.
- 5 64. A valve module according to claim 62, wherein the connector is a swivel connector, wherein the gases inlet is oriented substantially transversely relative to a longitudinal axis of the valve manifold, and wherein the gases inlet of the swivel connector is arranged to rotate in substantially any direction relative to the valve manifold via a ball and socket arrangement.
- 10 65. A valve module according to claim 63 or 67, wherein the gases inlet of the swivel connector extends in a substantially perpendicular direction relative to the longitudinal axis of the valve manifold.
66. A valve module according to any one of claims 63 to 65, wherein the gases inlet of the valve manifold is axially located at or toward an end of the valve manifold.
- 15 67. A valve module according to any one of claims 63 to 66, wherein the gases inlet of the swivel connector is rotatable through up to about 190 degrees about the longitudinal axis of the valve manifold, or through up to about 180 degrees about the longitudinal axis of the valve manifold, or through up to about 160 degrees about the longitudinal axis of the valve manifold, or through up to about 120 degrees about the longitudinal axis of the valve manifold, or through up to about 90 degrees about the longitudinal axis of the valve manifold, or through up to about 60 degrees about the longitudinal axis of the valve manifold, or through up to about 45 degrees about the longitudinal axis of the valve manifold.
- 20 68. A valve module according to any one of claims 53 to 61, wherein the valve manifold gases inlet extends substantially transversely relative to a longitudinal axis of the valve manifold, and is fluidly connectable to a gas supply line, and wherein the valve and valve manifold are rotatable relative to the valve carrier about the longitudinal axis of the valve manifold.
- 25 69. A valve module according to claim 68, wherein the valve manifold gases inlet extends in a substantially perpendicular direction relative to the longitudinal axis of the valve manifold.
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70. A valve module according to claim 68 or 69, wherein the valve and valve manifold are rotatable relative to the valve carrier through up to about 190 degrees about the longitudinal axis of the valve manifold, or through up to about 180 degrees about the longitudinal axis of the valve manifold, or through up to about 160 degrees about the longitudinal axis of the valve manifold, or through up to about 120 degrees about the longitudinal axis of the valve manifold, or through up to about 90 degrees about the longitudinal axis of the valve manifold, or through up to about 60 degrees about the longitudinal axis of the valve manifold, or through up to about 45 degrees about the longitudinal axis of the valve manifold.
71. A valve module according to any one of claims 41 to 70, wherein the valve module is arranged to directly couple with a filter module to provide a gas flow path from the valve module to the filter module.
72. An apparatus for delivering a flow of gas, comprising:
- a housing with a gases outlet for delivering a flow of gas to a patient, the housing defining a recess; and
- a filter module according to any one of claims 1 to 28 engaged with the recess.
73. An apparatus according to claim 72, further comprising a valve module according to any one of claims 41 to 71.
74. An apparatus according to claim 73, wherein the valve module is directly coupled with the filter to provide a gas flow path from the valve module to the filter.
75. An apparatus for delivering a flow of gas, comprising:
- a housing defining a recess;
- and a valve module according to any one of claims 41 to 71 removably received in the recess of the housing.
76. An apparatus according to claim 75, wherein the valve module is retained in the recess of the housing by fasteners, a snap fit, a releasable snap fit, or the like.

77. An apparatus according to claim 75 or 76, wherein the valve module is as claimed in any one of claims 67 to 70, wherein the gases inlet that is fluidly connectable to the gas supply line is movable between a substantially horizontal position and a substantially vertical position, relative to the housing.
- 5 78. An apparatus for delivering a flow of gas comprising:
- a housing with a gases outlet for delivering a flow of gas to a patient; and
- a connector comprising a gases inlet for receipt of a flow of gas from a gas supply line, wherein the gases inlet is fluidly connectable to a gas supply line to receive gas from the gas supply line, wherein the gases inlet of the connector is
- 10 arranged to move relative to the housing.
79. An apparatus according to claim 78, wherein the gases inlet of the connector is arranged to rotate relative to the housing.
80. An apparatus according to claim 79, wherein the gases inlet of the connector is rotatable through up to about 190 degrees relative to the housing, or through up
- 15 to about 180 degrees relative to the housing, or through up to about 160 degrees relative to the housing, or through up to about 120 degrees relative to the housing, or through up to about 90 degrees relative to the housing, or through up to about 60 degrees relative to the housing, or through up to about 45 degrees relative to the housing.
- 20 81. An apparatus according to claim 79 or 80, wherein the gases inlet extends substantially transversely relative to an axis of rotation of the gases inlet.
82. An apparatus according to claim 81, wherein the gases inlet extends substantially perpendicularly relative to the axis of rotation of the gases inlet.
83. An apparatus according to claim 81, wherein the gases inlet extends
- 25 substantially perpendicular to a sidewall of the housing.
84. An apparatus according to claim 81 or 82, wherein the axis of rotation is a first axis of rotation of the gases inlet of the connector, and wherein the gases inlet of the connector is additionally arranged to rotate about a second axis that is transverse to the first axis of rotation.

85. An apparatus according to any one of claims 78 to 84, wherein the gases inlet of the connector is arranged to rotate in substantially any direction relative to the valve manifold via a ball and socket arrangement.
86. An apparatus according to any one of claims 78 to 85, wherein the gases
5 inlet of the connector is arranged to translate relative to the housing.
87. An apparatus according to any one of claims 78 to 86, wherein the apparatus is arranged to simultaneously receive gas from the gases inlet and ambient air.
88. An apparatus according to claim 87, wherein the apparatus is configured
10 such that the gas from the gases inlet and the ambient air are dynamically entrained/mixed in the apparatus prior to being delivered to the gases outlet.
89. An apparatus according to any one of claims 78 to 88, comprising a valve module, wherein the connector is part of the valve module.
90. An apparatus according to claim 89, wherein the valve module is arranged
15 to control a flow of gas from gases inlet into the apparatus.
91. An apparatus according to any one of claims 78 to 90, wherein the connector is arranged to receive a gas supply line via a gas supply line connection.
92. An apparatus according to claim 91, wherein the gas supply line connection is moveable between a substantially horizontal position and a substantially vertical
20 position, relative to the housing.
93. The combination of:
- a valve module, wherein the valve module comprises a flow control valve, wherein the valve is arranged to control a flow of gas, and wherein the valve module is removably engageable with a housing of an apparatus for delivering a
25 flow of gas,; and
- a filter module, wherein the filter module is removably engageable with the housing of an apparatus for delivering a flow of gas, such that the filter module is accessible from an exterior of the housing, and wherein the filter module is arranged to receive gases from the valve module.

94. The combination of claim 93, wherein the valve module is arranged to directly couple with the filter module to provide a gas flow path from the valve module to the filter module.
95. The combination of claim 93 or 94, wherein the valve module comprises the valve and a valve manifold to receive gas from the valve, wherein the valve manifold has a valve manifold gases outlet that is arranged to deliver the gas from the flow control valve to the filter module.
96. The combination according to claim 95, wherein the valve module comprises a valve carrier that substantially contains and supports the valve and the valve manifold.
97. The combination according to claim 96, wherein the valve carrier comprises an ambient air inlet.
98. The combination according to any one of claims 93 to 97, wherein the valve module comprise a connector with a gases inlet for delivering gases to the valve.
99. The combination according to any one of claims 93 to 98, wherein the filter module comprises a filter body, wherein the filter body has a main compartment and at least one sub-compartment at least partly within the main compartment, wherein the main compartment and the at least one sub-compartment are arranged to receive gases from respective gases inlets, and are arranged to deliver gases through respective gases outlets.
100. The combination according to claim 99, wherein the filter module comprises a filter medium associated with the main compartment and the sub-compartment(s), wherein the filter medium is arranged to filter gases in, or exiting, the main compartment and the sub-compartment(s).
101. The combination according to claim 100, wherein the filter medium spans the main compartment gases outlet and the first sub-compartment gases outlet(s).
102. The combination according to any one of claims 93 to 101, wherein the valve module is substantially received within the housing and is accessible from an exterior of the housing.
103. An apparatus for delivering a flow of gas, comprising:

5 a housing with a gases outlet for delivering a flow of gas to a patient, a gases inlet, and a sealed gases path between the gases inlet and the gases outlet, the sealed gases path comprising a filter to filter gases that have been received from the first gases inlet, the filter comprising a filter body, a gases inlet, a gases outlet, and a filter medium that is arranged to filter gases in, or exiting, the filter body.

104. A filter according to claim 103, wherein the filter is a filter module that is removably and sealably engageable with the housing.

105. The apparatus of claim 103, wherein the filter module is removable
10 from the housing such that the sealed path is unsealed when the filter module is removed.

106. An apparatus for delivering a flow of gas, comprising:

a valve module, wherein the valve module comprises a flow control valve, wherein the valve is arranged to control a flow of gas; and

15 a filter module arranged to receive gases from the valve module.

107. The apparatus of claim 106, wherein the valve module is arranged to directly couple with the filter module to provide a gas flow path from the valve module to the filter module.

108. The apparatus of claim 106 or 107, wherein the valve module comprises the
20 valve and a valve manifold to receive gas from the valve, wherein the valve manifold has a valve manifold gases outlet that is arranged to deliver the gas from the flow control valve to the filter module.

109. The apparatus according to claim 108, wherein the valve module comprises a valve carrier that substantially contains and supports the valve and the valve
25 manifold.

110. An apparatus according to claim 109, wherein the valve carrier comprises an ambient air inlet.

111. An apparatus according to any one of claims 106 to 110, wherein the valve module comprise a connector with a gases inlet for delivering gases to the valve.

112. An apparatus according to any one of claims 106 to 111, wherein the filter module comprises a filter body, wherein the filter body has a main compartment and at least one sub-compartment at least partly within the main compartment, wherein the main compartment and the at least one sub-compartment are arranged
5 to receive gases from respective gases inlets, and are arranged to deliver gases through respective gases outlets.

113. An apparatus according to claim 112, wherein the filter module comprises a filter medium associated with the main compartment and the sub-compartment(s), wherein the filter medium is arranged to filter gases in, or exiting, the main
10 compartment and the sub-compartment(s).

114. An apparatus according to claim 113, wherein the filter medium spans the main compartment gases outlet and the first sub-compartment gases outlet(s).