

CLAIMS

1. A medical circuit component for use with humidified gas, comprising:
a wall defining a space within and wherein at least a part of said wall is of a breathable foamed material configured to allow the transmission of water vapor but substantially prevent the transmission of liquid water ~~or~~ and bulk flow of gases.
2. The component according to Claim 1, wherein the diffusion coefficient of the breathable foamed material is at least 3×10^{-7} cm²/s.
3. The component according to any preceding claim, wherein the thickness of the wall is between 0.1 mm and 3.0 mm.
4. The component according to any preceding claim, wherein the breathable foamed material comprises a blend of polymers.
5. The component according to any preceding claim, wherein the breathable foamed material comprises a thermoplastic elastomer with a polyether soft segment.
6. The component according to any preceding claim, wherein the breathable foamed material comprises a copolyester thermoplastic elastomer with a polyether soft segment.
7. The component according to any preceding claim, wherein the breathable foamed material is sufficiently stiff, such that the foamed material can be bent around a 25 mm diameter metal cylinder without kinking or collapse, as defined in the test for increase in flow resistance with bending according to ISO 5367:2000(E).
8. The component according to any preceding claim, wherein the permeability P of the component in g-mm/m²/day is at least 60 g-mm/m²/day when measured according to Procedure A of ASTM E96 (using the desiccant method at a temperature of 23°C and a relative humidity of 90%) and satisfies the formula:
$$P > \exp\{0.019[\ln(M)]^2 - 0.7\ln(M) + 6.5\}$$
in which M represents the elastic modulus of the foamed polymer in MPa and M is between 30 and 1000 MPa.
9. The component according to any preceding claim, wherein the foamed material has a void fraction greater than 25%.
10. The component according to any preceding claim, wherein the foamed material has an average void size in the transverse direction less than 30% of the wall thickness.

11. The component according to any preceding claim, wherein the foamed material comprises voids that are flattened along the wall's longitudinal axis, and wherein at least 80% of the voids have an aspect ratio of longitudinal length to transverse height greater than 2:1.
12. The component according to any preceding claim, wherein the foamed material comprises voids and at least 10% of the voids are interconnected.
13. The component according to any preceding claim, wherein the foamed material forms the wall of a tube.
14. The component according to claim 13, wherein the tube is an extruded tube.
15. The component according to claim 13 or 14, wherein the tube is a corrugated tube.
16. The component according to any of claims 13 through 15, wherein the tube is part of a patient interface.
17. The component according to any of claims 13 through 16, wherein the tube is an expiratory tube.
18. The component according to any one of claims 13 through 17, wherein the tube is an inspiratory tube.
19. The component according to any of claims 13 through 18, wherein the tube is a coaxial breathing tube.
20. The component according to any preceding claim comprising a heater.
21. The component according to any preceding claim, comprising a connector for connecting to other components, the connector comprising the breathable foamed material.
22. The component according to any preceding claim, wherein the component comprises a mask and the foamed material forms the entire wall of the mask.
23. The component according to any of claims 1 through 21, wherein the component comprises a mask and the foamed material forms portions of the wall of the mask.
24. The component according to any of claims 1 through 21, wherein the component comprises a nasal cannula and the foamed material is used in a cannula body of the nasal cannula.

25. The component according to any of the preceding claims, wherein the component comprises a short delivery tube and the foamed material is used in the short delivery tube.

26. The component according to any of claims 1 through 21 or 24, wherein the component comprises a short delivery tube of a nasal cannula and the foamed material is used in the short delivery tube.

27. The component according to any of claims 1 through 21, wherein the component comprises a catheter mount and the foamed material forms the entire wall of an outer tube of the catheter mount.

28. The component according to any of claims 1 through 21, wherein the component comprises a catheter mount and the foamed material forms portions of the wall of an outer tube of the catheter mount.

29. The component according to any of Claims 1 through 15, wherein the component comprises a tube for use in an insufflation system and the foamed material forms all or part of the wall of a tube for use in the insufflation system.

30. The component according to any of the preceding claims, wherein the foamed material is stiff and/or semi-rigid.

31. The component according to any of the preceding claims, wherein the foamed material comprises a first zone of closed cell foam material and a second zone comprising open cells.

32. The component according to claim 30, wherein the average and/or maximum void size is smaller in the first zone than in the second zone.

33. A kit of parts comprising the medical circuit component of claim 17 and any one or more of a humidification chamber, an inspiratory tube, a filter and Y-connector.

34. A medical circuit comprising a medical circuit component according to any one of claims 1 to 32, and at least one of a humidifier and a ventilator or blower unit.