Claims

~~What we claim is:~~

1. A medical tube comprising a conduit, the conduit formed from a spirally wound bead and a spirally wound film, wherein:

the spirally wound bead forms a plurality of successive coils, each of the plurality of successive coils having an internal diameter and an external diameter; and

the spirally wound film extends between adjacent coils of the bead wherein the film is bonded at a first location on a surface of a first coil of the bead and at a second location on a surface of a second coil of the bead, wherein the first coil is adjacent to the second coil,

wherein the first location and the second location are located between the internal diameters and external diameters on opposed sides of respective first and second adjacent coils such that the spirally wound film extending between the first and second coils of the bead does not overlap any sections of the spirally wound film extending between further adjacent coils of the bead.

2. The medical tube of claim 1, wherein each of the plurality of successive coils has a substantially uniform internal diameter and a substantially uniform external diameter when the medical tube is at rest~~.~~

~~3. The medical tube of claim 1 or claim 2~~ and/or, wherein the spirally wound film is inwardly biased between the first and second coils of the bead.

~~4~~3. The medical tube of ~~any one of claims~~claim 1 ~~to 3~~or claim 2, wherein the spirally wound bead comprises a thermoplastic polyurethane or a thermoplastic elastomer~~.~~

~~5. The medical tube of any one of claims 1 to 4~~ and/or, wherein the spirally wound film comprises a thermoplastic polyurethane or a thermoplastic elastomer.

~~6,~~4. The medical tube of any one of claims 1 to ~~5~~3, wherein a length of the conduit is between about 100mm to 1000mm~~.~~

~~7. The medical tube of claim 6,~~ or wherein the length of the conduit is approximately 300mm.

~~8~~5. The medical tube of any one of claims 1 to ~~7~~4, wherein the plurality of successive coils comprises a pitch, and the pitch is between about 1.5mm to 3.5mm when the medical tube is at rest.

~~9~~6. The medical tube of any one of claims 1 to ~~8~~5, wherein the conduit has a minimum internal diameter between about 10mm to 16.8mm when the medical tube is at rest~~.~~

~~10. The medical tube of any one of claims 1 to 9,~~ and/or wherein the plurality of successive coils have an internal diameter between about 10mm to 17mm when the medical tube is at rest, and/or wherein the plurality of successive coils have an external diameter between about 11 mm to 18mm, and/or wherein the plurality of successive coils have an external diameter between about 16mm to 20mm.

~~11. The medical tube of any one of claims 1 to 10, wherein the plurality of successive coils have an external diameter between about 11mm to 18mm.~~

~~12. The medical tube of any one of claims 1 to 10, wherein the plurality of successive coils have an external diameter between about 16mm to 20mm.~~

~~13~~7. The medical tube of any one of claims 1 to ~~12~~6, wherein the spirally wound bead has a cross-sectional shape that is substantially D-shaped~~.~~

~~14. The medical tube of any one of claims 1 to 12,~~, or wherein the spirally wound bead has a cross-sectional shape that is substantially elliptical, ~~and preferably comprises~~or wherein the spirally wound bead has a cross-sectional shape comprising a flattened elliptical shape.

~~15~~8. The medical tube of any one of claims 1 to ~~14~~7, wherein the spirally wound bead has a cross-sectional width of approximately ~~1mm~~1 mm in a direction parallel to a longitudinal axis of the medical tube and a cross-sectional height of approximately ~~1mm~~1 mm in a direction perpendicular to the longitudinal axis of the medical tube, and/or wherein the spirally wound film has a thickness of about 0.05mm to 1 mm.

~~16. The medical tube of any one of claims 1 to 15, wherein the spirally wound film has a thickness of about 0.05mm to 1mm.~~

~~17~~9. The medical tube of any one of claims 1 to ~~16~~8, wherein the conduit has a ratio of thickness of the spirally wound bead to the spirally wound film of about 1:0.05 to about 1:1~~.~~

~~18. The medical tube of any one of claims 1 to 17,~~, and/or wherein the medical tube has a resistance to flow of less than or equal to 1.5mm/H_2O when in a straightened ~~non-extended~~nonextended position at 30 L/Min~~.~~

~~19. The medical tube of any one of claims 1 to 18,~~, and/or wherein the plurality of successive coils have a coil angle between about 3 degrees and 6 degrees~~.~~

~~20. The medical tube of any one of claims 1 to 19,~~, and/or wherein the conduit has a strength in tension greater than 40N when extended at 60mm/min, and~~ preferably~~ /or wherein the conduit has a strength in tension of at least 120N~~.~~

~~21. The medical tube of any one of claims 1 to 20,~~ when extended at 60mm/min, and/or wherein the conduit can elongate from 100% of its resting length up to at least 210% of its resting length without substantial plastic deformation occurring, and/or wherein the conduit has a weight between about 20 grams per meter and 100 grams per meter.

~~22. The medical tube of any one of claim 1 to 21, wherein the conduit has a weight between about 20 grams per meter and 100 grams per meter.~~

~~23~~10. The medical tube of any one of claims 1 to ~~22~~9, wherein the first and/or second locations comprise a portion of the bead adjacent the external diameter of the bead~~.~~

~~24. The medical tube of any one of claims 1 to 23,~~, and/or wherein opposing edges of adjacent windings of the film are disposed on the bead substantially adjacent each other and/or in a substantially facing relationship, and/or wherein the first location and the second location are asymmetric.

~~25. The medical tube of any one of claims 1 to 24, wherein the first location and the second location are asymmetric.~~

~~26~~11. The medical tube of any one of claims 1 to ~~25~~10, wherein the film, in cross-section, forms an angle of between about 170 degrees and about 190 degrees, ~~and preferably~~or wherein the

film, in cross-section, forms an angle of about 180 degrees at a point of inflection, and/or wherein the film, in cross-section, forms a substantially sinusoidal shape about the bead.

~~27. The medical tube of any one of claims 1 to 26, wherein the film, in cross-section, forms a substantially sinusoidal shape about the bead.~~

~~28~~12. The medical tube of any one of claims 1 to ~~25~~10, wherein the film, in cross-section, forms an angle of between about 45 degrees and about 135 degrees, ~~preferably~~or between about 80 degrees and about 100 degrees, ~~and more preferably~~or about 90 degrees, at a point of inflection.

~~29~~13. The medical tube of any one of claims 1 to ~~25~~10 or claim ~~28~~12, wherein the first location and/or the second location, in cross-section, extends inwardly beyond a parallel axis and/or a widest point of the bead.

~~30~~14. The medical tube of any one of claims 1 to ~~25~~10, claim ~~28~~12 or claim ~~29~~13, wherein the film forms an Omega (~~ΩΩ~~)-shape about each of the coils.

~~31~~15. The medical tube of any one of claims 1 to ~~30~~14, wherein the medical tube further comprises a first connector at a first end configured for connection with a patient interface, and a second connector at a second end configured for connection with a respiratory device.

~~32. An apparatus for the delivery of positive pressure respiratory therapy comprising:~~

~~the medical tube of any one of claims 1 to 31, and~~

~~a patient interface.~~

~~33. A medical tube comprising:~~

~~a conduit formed from an elongate bead spirally wound with an elongate film, the elongate bead bonded with the elongate film,~~

~~wherein the elongate bead and the elongate film are wound in an alternating arrangement such that the elongate film of a first winding is separated from the elongate film of a second winding by the elongate bead.~~

~~34. A medical tube comprising:~~

~~a conduit formed from a spirally wound elongate bead and a film,~~

~~the spirally wound elongate bead forming a plurality of successive coils, and~~

~~the film bonded to the spirally wound elongate bead and extending between adjacent coils,~~

~~wherein the conduit is formed by alternating coils and film portions without the film overlapping itself,~~

~~35. A medical tube comprising:~~

~~a conduit comprising a spiral elongate bead and a film,~~

~~the spiral elongate bead forming a plurality of coils, each of the plurality of coils having an inner surface facing radially inwards and an outer surface facing radially outwards, and.~~

~~36. the film extending between adjacent coils, the film bonded to adjacent coils such that at least a portion of the inner surface and outer surface of each of the plurality of coils are substantially exposed and a section of the film extending between a first coil and a second coil~~

of the plurality of coils of the elongate bead does not overlap any sections of the film extending between further adjacent coils of the bead.

37. A medical tube comprising:

a spirally wound bead forming a plurality of successive coils, each of the plurality of successive coils having an Internal diameter and an external diameter, and

a spirally wound film extending between adjacent coils of the bead wherein the film is bonded at a first location on a surface of a first coil of the bead and at a second location on a surface of a second coil of the bead, wherein the first coil is adjacent the second coil,

wherein the first location and second location are located between the internal diameters and external diameters of respective first and second adjacent coils,

the spirally wound film extending between the first and second coils of the bead does not overlap the spirally wound film extending between further adjacent coils of the bead, and

the spirally wound film is inwardly biased between the first and second coils of the bead, and

together the spirally wound bead and spirally wound film form a conduit.

38. A medical tube comprising a conduit, the conduit comprising:

a spirally-wound bead; and

a spirally-wound film.

39. wherein the film is bonded to the bead such that opposing edges of adjacent windings of the film are disposed on the bead substantially adjacent each other in a substantially facing relationship.

~~40. A medical tube comprising:~~

~~a spirally-wound elongate bead; and~~

~~a spirally-wound elongate attached to the bead and extending between adjacent windings of the bead;~~

~~wherein, in cross-section, the film conforms to the bead so as to form a substantial Omega (Ω)-shape about the bead,~~

~~41 . A method of forming a conduit, wherein the method comprises:~~

~~extruding an elongate bead member,~~

~~extruding a film member, and~~

~~spirally wrapping the extruded elongate bead member with the extruded film member such that the elongate bead member and the thin film member bond together to form a conduit,~~

~~wherein the elongate bead member and the elongate film member are wound in an alternating arrangement such that the elongate film of a first winding is separated from the elongate film of a second winding by the elongate bead.~~