

CLAIMS:

1. A filtration medium for filtering particles within a range of particle sizes, the filtration medium comprising:

- a first piece of textile having a first fiber orientation of predominance;
- a second piece of textile superposed to the first piece of textile, the second piece of textile having second fiber orientation of predominance,
- sealing along a peripheric edge the first piece of textile superposed to second piece of textile to define the filtration medium,

wherein the first piece of textile and the second piece of textile are superposed with their fiber orientations of predominance being non-aligned relative to each other thereby together having a filtration medium of better isotropy than any one of the first piece of textile and the second piece of textile alone.

2. The filtration medium of claim 1, wherein the first piece of textile and the second piece of textile are of same or different textile.

3. The filtration medium of claim 1, wherein the first piece of textile is one of the following textile:

- a nonwoven textile of between 10gsm and 50gsm or 51gsm and 90gsm;
- a melt-blown textile of between 10gsm and 50gsm or 51gsm and 90gsm;
- a textile of nanofibers, microfibers or combination thereof of between 10 gsm and 50 gsm or 51gsm and 90gsm comprising short and long fine fibers;
- nonwoven felt of short fibers, long fibers or combination thereof of between 40gsm and 300gsm;
- a calendered nylon micro- or nanoperforated textile and/or polymer; and
- a paper-textile made of at least one of cellulose, polyester and polypropylene.

4. The filtration medium of any one of claims 1 to 3, wherein the first piece of textile and the second piece of textile taken together provides fibers of a variety of diameters and lengths.

5. The filtration medium of any one of claims 1 to 3, wherein the first textile is a nonwoven textile having a first structural side and a first fragile-fiber side, and the second textile having a second structural side and a second fragile-fiber side; and
wherein the first fragile-fiber side faces the second fragile-fiber side.

6. The filtration medium of any one of claims 1 to 3, wherein the first piece of textile is a nonwoven textile having a first structural side and a first fragile-fiber side; and
wherein the first fragile-fiber side is facing and superposed on any side of the second piece of textile and the two pieces of textiles are sealed together along a peripheric edge defining an enclosure for the fragile-fiber side of the first piece of textile.

7. The filtration medium of any one of claims 1 to 6, further comprising at least a third piece of textile; and
wherein the third piece of textile has a third fragile-fiber side facing and superposed on the first structural side of the first piece of textile; or
the third piece of textile has a third fragile-fiber side facing and superposed on the fragile-fiber side of the first or second piece of textile.

8. The filtration medium of any one of claims 1 to 6, further comprising at least a third and a fourth pieces of textile; and
wherein the third piece of textile has a third fragile-fiber side facing and superposed on a fourth fragile-fiber side of the fourth piece of textile forming together a unit of

two superposed pieces of textiles which unit is superposed on the first structural fiber side or the second structural fiber side or is positioned in between the first and second fragile-fiber sides; or

wherein the fourth piece of textile has a fourth fragile-fiber side facing and superposed on a third structural fiber side of the third piece of textile defining forming together a unit of two superposed pieces of textiles which unit is superposed on the first structural fiber side or the second structural fiber side or in between the first and second fragile-fiber sides.

9. The filtration medium of any one of claims 1 to 6, further comprising at least a third, a fourth and a fifth pieces of textile; and

wherein the third piece of textile has a third fragile-fiber side facing and superposed on a fourth fragile-fiber side of the fourth piece of textile defining forming together a unit of two superposed pieces of textiles which unit is superposed on the first structural fiber side or the second structural fiber side or is positioned in between the first and second fragile-fiber sides; and

wherein the fifth piece of textile has a fifth fragile-fiber side facing and superposed on a structural fiber side of any piece of textile positioned on an outside surface or is positioned in between the first and second fragile-fiber sides or between the third and fourth fragile-fiber sides; or

wherein the fourth piece of textile has a fourth fragile-fiber side facing and superposed on a third structural fiber side of the third piece of textile forming together a unit of two superposed pieces of textiles which unit is superposed on the first structural fiber side or the second structural fiber side or in between the first and second fragile-fiber sides; and.

wherein the fifth piece of textile fifth fragile-fiber side facing and superposed on a structural fiber side of any piece of textile positioned on an outside surface or is positioned in between the first and second pieces of textile or between the third and fourth pieces of textile.

10. The filtration medium of any one of claim 1 to 6, further comprising a third piece of textile comprising a protective weft protecting the first textile.

11. The filtration medium of any one of claims 1 to 10, featuring a pressure loss of less than 8.55mm H₂O per cm².

12. The filtration medium of any one of claims 1 to 11, wherein the superposed pieces of textile are sealed together along a peripheric edge.

13. The filtration medium of claim 12, wherein the pieces of textile are sealed together by one of sewing, peripheral binding, glue, thermofusion and ultrasound fusion.

14. The filtration medium of any one of claims 1 to 13, wherein the filtration medium has a loss over its filtration characteristics of less than 40% after 25 cleaning cycles.

15. The filtration medium of any one of claims 1 to 13, wherein the filtration medium has a loss over its filtration characteristics of less than 45% after 50 cleaning cycles.

16. The filtration medium of any one of claims 1 to 13, wherein the filtration medium has a loss over its filtration characteristics of less than 50% after 100 cleaning cycles.

17. A barrier mask adapted to be placed over a wearer's face in front of the wearer's mouth and nostrils for filtration of particles including biological pathogens, the barrier mask comprising:

- at least one of a mask inner layer or a mask outer layer;
- a filtration layer comprising the filtration medium of any one of claims 1 to 16; wherein the filtration layer and at least one of the inner layer and the outer layer are superposed and sealed together to form a barrier mask; and
- at least one of a fastening member selected from the group consisting of ear loops and elastic band adapted to rest on a wearer's head which fastening member is attached to the barrier mask to maintain same over the wearer's face for filtration of the particles therethrough.

18. A filtration device mounted to air-forced mechanical filtration device for filtration of particles in air, comprising the filtration medium of any one of claims 1 to 16.

19. A piece of cloth, a garment or a garment accessory comprising the filtration medium of any one of claims 1 to 16.

20. A method of making a filtration layer for filtration of particles, comprising: superimposing a first piece of textile and a second piece of textile each having a fiber orientation of predominance with their fiber orientations of predominance being non-aligned relative to each other of at least 10 degrees thereby having together a filtration medium of better isotropy than any one of the first piece of textile and the second textile alone.

21. The method of claim 20, wherein the first piece of textile and the second piece of textile are of same or different textiles.

22. The method of claim 20, wherein the first textile is a nonwoven having a structural side and a fragile-fiber side, and wherein the fragile-fiber side of the first piece of textile faces the fragile-fiber side of the second piece of textile.

23. The method of any one of claims 19 to 21 for the preparation of the filtration medium of any one of claims 5 to 9.