

1122.05.95

Attorney Docket No. CH/29/PCT

IN THE EUROPEAN PATENT OFFICE

Applicant:)
W. L. Gore & Associates, Inc.)
Application No.: PCT/US94/07162)
Filed: 24 June 1994 (24.06.94))
Authorized Officer: :D. Hutton)
For: WATER VAPOR PERMEABLE AIR)
IMPERMEABLE FILM AND COMPOSITE)
COATINGS AND LAMINATES)

European Patent Office Headquarters
Erhardtstrasse 27
D-8000 Munich 2
Germany

REPLY TO FIRST WRITTEN OPINION

dated 27 October 1995

Dear Sir:

In reply to the Written Opinion dated 27 October 1995, new claim pages are provided (along with marked-up original pages) which define the claimed subject matter more particularly.

A new page 4 is submitted along with marked-up original page 4, to correct an error.

Applicant's Invention

Non-porous, air-impermeable polymers are polymers that have no pores or voids through them so that neither liquid water nor air can pass through them. Some such polymers however are permeable to water-vapor due to their ability to transport individual water molecules through them by molecular diffusion, as will be explained later in the discussion concerning the art rejection.

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Applicant has discovered that the ability of these non-porous polymers to transport water-vapor molecules through them is unexpectedly increased when hydrophilic absorbent particles are incorporated into the non-porous polymer.

Among the non-porous polymers employed by Applicant are polyurethanes. Among the hydrophilic absorbent particles are acrylic polymers and cellulose derivatives.

The usefulness of the absorbent filled polymers of the invention is as laminates or coatings on garments to enhance pass-through of water-vapor from the body.

Novelty - Rejection on JP-61-160480 (D1)

A full English translation of the Japanese text is provided herewith.

The Examiner states that this reference discloses the production of water resistant, moisture permeable fabrics by applying a polyurethane resin containing an absorbent resin to a fabric. He rejects Claims 1-12, 17-20, and 22 as lacking novelty over this patent.

What D1 discloses is coating a fabric substrate with a polyurethane solution containing an acrylic compound and an inorganic or organic fine powder to impart water resistance and humidity to said fabric substrate.

The coating is formed by the polyurethane component. It is made moisture permeable through formation of micropores (see page 3, line 16) which are formed when the acrylic compound is extracted (see page 4, lines 11-12).

The acrylic compound can be a monomer, a polymer, or a copolymer (see page 3, lines 5-7 from the bottom of the translation). A list of monomers is provided bridging pages 3 and 4. Page 4, lines 8-9 state that "...Those readily soluble both in water and dimethylformamide solvent are particularly preferred." Lines 11-12 make clear that these acrylic compounds are extracted.

The inorganic or organic fine powder remains in the pores of the polyurethane. Examples of organic fine powders are listed at page 4, last 5 lines. Polyacrylic resins are listed.

Applicant's Argument

In JP-480, the polyurethane, acrylic compound, and organic fine powder are coated onto a fabric and a wet solidification step carried out to extract the acrylic compound while the organic fine powder remains behind in the pores formed when the acrylic compound is removed. Thus, the acrylic compound is washed out in this procedure. It is noted that the acrylic compound should be readily water soluble to facilitate their extraction (see D1, page 4, lines 8-12).

The washing out creates pores in the polyurethane. The inorganic or organic fine powders are left behind in the pores (see D1, page 4, lines 16-17). In contrast, Applicant's absorbent particles are in the polymer. They cannot be in any pores since there are no pores in Applicant's claimed compositions. This points up how different Applicant's composition are from those of JP-480. Applicant's polymeric resin films are nonporous and air-impermeable. This is why Applicant's discovery is so surprising - that water vapor passage is enhanced in a nonporous polymer by the presence of water absorbent particles.

That difference is further elucidated by the fact that the teachings of JP-480 can only result in a microporous coating and not a non-porous coating. According to McGraw-Hill dictionary of scientific and technical terms, a microporous barrier is "a metallic or plastic membrane with micrometer-sized pores used for dialysis and other membrane separation processes." Owing to the presence of micropores that are micrometer-sized, the microporous coating prevents the entry of much larger water drops until a critical threshold pressure is reached but allows much smaller water vapor molecules to

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permeate through the micropores. These coatings are therefore not absolute barriers, are permeable to air and are susceptible to contamination by low surface tension liquids like sweat, oils, etc. In addition, the rate of water vapor transport is controlled mainly by the microporous structure and not by the chemical nature of the membrane material.

In comparison, Applicant's invention is to non-porous membranes (also known as dense membranes in the art). In this case, there are no micrometer-sized pores, rather all unoccupied volume are of molecular dimensions (nanometer scale) and simply represent the free space between molecules comprising the membrane. Unlike microporous membranes which consist of interconnecting pores, non-porous or dense membranes serve as an absolute barrier against liquid water, wind, bacteria, particulates, microorganisms, low surface tension contaminants like perspiration, surfactants, and oils. Also, it is because of this that the polymer film of the present invention is impermeable to air.

Water vapor permeates through non-porous/dense membrane by the solution-diffusion mechanism which is an entirely different mechanism than that outlined above for microporous membranes. In this case, the rate of water vapor transport depends strongly on the hydrophilicity and thus on the chemical composition of the membrane material. The science behind the present invention is to alter the effective solubility of water vapor in the non-porous polymer film by using highly water absorbent particles uniformly dispersed within the polymer film such that the rate of water vapor permeation is increased. Thus, the non-porous, air-impermeable films of the present invention are not the same as the microporous, air-impermeable film that results from the teaching of the JP-480 patent.

Fine organic or inorganic particles are used by JP-480 to block the micropores and improve the resistance to liquid water penetration without

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adversely affecting the rate of water vapor permeation. It is not conceivable that these particles, even polyacrylic resin, are arranged perfectly within the micropores such that a dense membrane free of micropores is created that can serve as an absolute barrier against air, microorganisms or contaminants.

If indeed such a dense membrane is obtained by perfect clogging of the micropores with inorganic particles, the rate of water vapor permeation would be adversely affected since the micropores now are not available for permeation. That does not seem to be the case as per the teachings of the patent as well as from the examples cited.

The coating, as taught by JP-480, is therefore still microporous in nature and thus permeable to air and not "non-porous" as inferred by the Examiner.

In other words, the fine powder cannot completely block the pores. The reference says at page 4, lines 17-18 that the fine powder blocks the pores during waterproofing without lowering moisture permeability. Since the water molecular permeation in '480 is through the pores of the polyurethane it cannot be concluded by any stretch of the imagination that the fine powder particles completely block the pores. They cannot. (See Table 1 of '480 where the moisture permeability is quite high).

In view of the foregoing, it is respectfully submitted that Applicant's claims are novel over D1.

Inventive Step EP 523806 (D2)

This patent discloses a coated fabric in which the coating is porous (see page 3, lines 51-53).

The Examiner points to "p. 1, 1.9 et seq" and to "p.1, 1.12-17." Applicant presumes the Examiner means page 3 instead of page 1. Those passages are very general in nature and do not at all suggest use of the absorbent particles that Applicant covers in his claimed invention. D1 mentions hydrophilic

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polymers at page 3, line 17, but only in combination with a mixture of surface active agents. Moreover, the definition of "hydrophilic" is not synonymous with "absorbent."

In addition in D2, its claimed porous polyurethane film is filled with inorganic fine powder materials, which are defined on page 5, lines 9-14. These are nothing like Applicant's absorbent particles.

Inventive Step - DP 193808 (D3)

This patent teaches preparation of microporous coatings (see column 2, lines 43-45 of U.S. Patent 4,743,470, the U.S. counterpart. Using the patented process, it is not possible to obtain any other composition. Applicant's claims differentiate over this '808 reference in that Applicant's claimed compositions are not porous. As pointed out above, Applicant's claims recite non-porosity.

CONCLUSION

In view of the foregoing, Applicant believes his claims are in good and proper order and are patentable over the cited art.

Respectfully submitted,



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Date:

Dec 21, 1995

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nipped therebetween. Owing to the very low moisture vapor transmission rate of the polyethylene film, the layered article of this invention is expected to be essentially non-breathable thereby leading to discomfort to the user in prolonged use of the article. U.S. Patent 5,043,209 to Boisse et al., describes an absorbent liner for non-breathable protective clothing for absorption of sweat. Since the entire clothing ensemble is not breathable, it is expected to become uncomfortable to the user on prolonged use as the absorbent liner becomes saturated with sweat.

It would therefore be desirable to be able to make body fluid-absorbing articles that are not only absorbent and air and/or liquid impermeable, but also has the desired property of high permeability to water vapor as measured by its water vapor transmission rate. This ability to adjust the WVTR of such articles would allow a better control of the desired microclimate in the immediate vicinity of the body for each specific end-use.

SUMMARY OF THE INVENTION

It has now surprisingly been discovered that the water vapor transmission rate (WVTR) of a nonporous polymeric film can be increased by incorporating into it hydrophilic absorbent particles. Particles that absorb water are not known for an ability to increase water vapor transmission rates. The compositions of this invention provide for controlled increase in WVTR of the non-porous polymer film or of composites containing it which can be used in articles of protective clothing and medical dressing with balanced properties of protection and comfort to the user.

One material of the invention is in the form of a waterproof, air impermeable, water vapor permeable non-porous polymer film or sheet comprising a polymer resin and hydrophilic absorbent particles having absorptive capacity greater than 1 gram of water per gram of dry (water-free) particles. The amount of the particles present is such that the WVTR of the film or sheet is higher than that of a comparable film of the polymer resin alone. The film or sheet can be substantially planar in nature or can be in the form of a three-dimensional shaped article.

The polymer film or sheet of this invention, can be combined with other substrates like fabrics or porous membranes to form layered

in particular from 0.1 to 50 parts of hydrophilic particles per 100 parts of the polymeric resin.

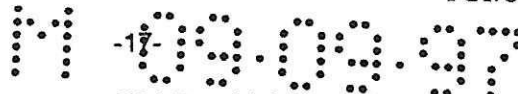
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of such filler particles. Additionally, the polymer can also contain various additives like colorants, antioxidants, U.V. stabilizers, flame retardants, antiblocking agents, release agents and antistatic agents. Furthermore, depending on the particular end use, the polymer can also contain functional ingredients like odor-absorbing agents, anti-bacterial agents, fragrances, antifungal agents, hemostatic agents and wound-healing agents.

The water vapor permeable polymer film of this invention is obtained preferably by blending the absorbent particles with the polymer resin and then processing them to form useful articles like two-dimensional films, coatings or laminates and three-dimensional molded articles that are breathable, waterproof and air impermeable. The amount of absorbent particle blended into the polymer resin will depend on the level of increase in water vapor transmission rate desired for a particular application, the film thickness desired as well as the ability of the polymer resin to bind and retain the particles without losing the particles during use due to insufficient bond to the resin. A minimum amount of particles present will be an amount that results in an increase of the WVTR of the polymer film. Preferably the amount will be an amount that results in an increase in the MVTR of at least 10%.

Typically, the amount of absorbent particle will range from 0.1 to 25-50, *preferably 0.1 to 25* parts per 100 parts of the resin by weight, *more* preferably in the range of 1 to 10 parts per 100 parts of the resin by weight. Depending on the physical properties of the polymer film, though the water vapor transmission rate will increase with the increase in the particle content, the mechanical integrity as reflected by the physical properties (like tensile strength, elongation, etc.) may begin to be adversely affected. The deterioration of the physical property of the polymer film will limit the maximum amount of particles that may be incorporated into a polymer resin. Moreover, poor mechanical integrity will adversely affect the handleability of the polymer film by making it susceptible to defects (like pin holes, micro cracks etc.) which will lead to air permeation through the film. In addition, excessive amounts of the hydrophilic particles will lead to having some of the particles not securely attached to the polymer resin thereby leading to creation of defects and loss of the particles from the polymer film in actual end-use.

When the absorbent particles are dispersed in a polymer resin, the size of the particles plays an important role in obtaining the polymer



seconds, a bubble point of about 179 kPa, thickness of about 37
microns and a weight of about 20 gms/m², available from W. L. Gore &
Associates of Newark, Delaware, was heat sealed to the lip of the cup to
create a taut, leakproof, microporous barrier containing the salt solution.
5 A similar expanded PTFE membrane was mounted taut on the surface of
a water bath while ensuring that the membrane is in contact with the
water in the bath. The water bath assembly was controlled at 23°C, plus
or minus 0.2°C, utilizing a temperature controlled room and a water
circulating bath.

10 The sample area for testing WVTR was approximately 7.5 cm.
diameter. The sample was equilibrated in a room having a relative
humidity of about 50% for a minimum of four hours. The sample was
then placed on the surface of the expanded PTFE membrane covering
the water bath. In case of coated membranes, coated fabric and fabric
15 laminate samples, the substrate and not the coating was in contact with
the expanded PTFE membrane covering the water bath.

The cup assembly was weighed to the nearest 1/1000 gm. and was
placed in an inverted manner onto the center of the test sample.

20 Water vapor transport was provided by the driving force between
the water and the saturated salt solution providing water vapor flux by
diffusion in that direction. The sample was tested for 15 minutes and
the cup assembly was then removed and weighed again to within 1/1000
gm.

25 The WVTR of the sample was calculated from the weight gain of
the cup assembly and was expressed in grams of water per square
meter of sample area per 24 hours. Several areas were tested within a
sample and the average WVTR value is reported.

EXAMPLES

30

Example 1A

A hydrophilic polyurethane solution (SOLUCOTE TOP 932, *a trade name*)
comprised of about 42% solids content including about 4% silica
35 particles with a water absorption of about 66%) was obtained from
Soluol Chemical Co. To 37.7 grams of this solution, 0.79 grams (5 phr,
i.e. parts per 100 parts of polymer resin) of a hydrophilic cross-linked
polyacrylic acid salt, obtained from Nalco Chemical Co., with an

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nipped therebetween. Owing to the very low moisture vapor transmission rate of the polyethylene film, the layered article of this invention is expected to be essentially non-breathable thereby leading to discomfort to the user in prolonged use of the article. U.S. Patent 5,043,209 to Boisse et al., describes an absorbent liner for non-breathable protective clothing for absorption of sweat. Since the entire clothing ensemble is not breathable, it is expected to become uncomfortable to the user on prolonged use as the absorbent liner becomes saturated with sweat.

It would therefore be desirable to be able to make body fluid-absorbing articles that are not only absorbent and air and/or liquid impermeable, but also has the desired property of high permeability to water vapor as measured by its water vapor transmission rate. This ability to adjust the WVTR of such articles would allow a better control of the desired microclimate in the immediate vicinity of the body for each specific end-use.

SUMMARY OF THE INVENTION

It has now surprisingly been discovered that the water vapor transmission rate (WVTR) of a nonporous polymeric film can be increased by incorporating into it hydrophilic absorbent particles. Particles that absorb water are not known for an ability to increase water vapor transmission rates. The compositions of this invention provide for controlled increase in WVTR of the non-porous polymer film or of composites containing it which can be used in articles of protective clothing and medical dressing with balanced properties of protection and comfort to the user.

One material of the invention is in the form of a waterproof, air impermeable, water vapor permeable non-porous polymer film or sheet comprising a polymer resin and hydrophilic absorbent particles having absorptive capacity greater than 1 gram of water per gram of dry (water-free) particles. The amount of the particles present is such that the WVTR of the film or sheet is higher than that of a comparable film of the polymer resin alone. The film or sheet can be substantially planar in nature or can be in the form of a three-dimensional shaped article.

The polymer film or sheet of this invention, can be combined with other substrates like fabrics or porous membranes to form layered

AMENDED SHEET

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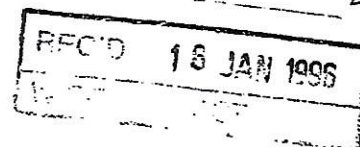
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PATENT COOPERATION TREATY

PCT





INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CH/29	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US 94/ 07162	International filing date (day-month-year) 24/06/1994	Priority date (day-month-year) 26/05/1994
International Patent Classification (IPC) or national classification and IPC C08L75/04		
Applicant W. L. GORE & ASSOCIATES INC.		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>7</u> sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consists of a total of <u>3</u> sheets.</p>
<p>3. This report contains indications and corresponding pages relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input checked="" type="checkbox"/> Certain defects in the international application</p> <p>VIII <input checked="" type="checkbox"/> Certain observations on the international application</p>

Date of submission of the demand 21/08/1995	Date of completion of this report 15. 01. 96
Name and mailing address of the IPEA:  European Patent Office D-80298 Munich Tel. (+ 49-89) 2399-0, Tx: 523656 epmu d Fax: (+ 49-89) 2399-4463	Authorized officer  D. Hutton Telephone No.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/US94/07162

I. Basis of the report

1. This report has been drawn up on the basis of (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.):

☐ the international application as originally filed.

☒ the description, pages 1-3, 5-23 _____, as originally filed,
pages _____, filed with the demand,
pages 4 _____, filed with the letter of 21.12.95,
pages _____, filed with the letter of _____,

☒ the claims, Nos. 20-23 _____, as originally filed,
Nos. _____, as amended under Article 19,
Nos. _____, filed with the demand,
Nos. 1-19 _____, filed with the letter of 21.12.95,
Nos. _____, filed with the letter of _____,

☐ the drawings, sheets/fig _____, as originally filed,
sheets/fig _____, filed with the demand,
sheets/fig _____, filed with the letter of _____,
sheets/fig _____, filed with the letter of _____.

2. The amendments have resulted in the cancellation of:

☐ the description, pages _____.
☐ the claims, Nos. _____.
☐ the drawings, sheets/fig _____.

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

Intern. application No.

PCT/US94/07162

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 1-23 Yes	YES
	Claims	NO
Inventive Step (IS)	Claims 1-23 Yes	YES
	Claims	NO
Industrial Applicability (IA)	Claims 1-23 Yes	YES
	Claims	NO

2. CITATIONS AND EXPLANATIONS

The following documents have been considered for the purposes of formulating this report:-

- D1 = Database WPI Week 8635, Derwent Publications Ltd., London, GB; AN 229633
"Water Resistant Moisture Permeable Fabric Production", & JP-A-61 160 480 (Toray) 21 July 1986, * Abstract *.
- D2 = EP-A-0 523 806
- D3 = EP-A-0 193 808

Document D1 discloses the production water resistant, moisture permeable fabrics by applying a polyurethane resin containing an acrylic component and fine particles. The acrylic component is subsequently eluted to yield a porous membrane.

Document D2 describes various approaches to the preparation of moisture permeable and water proof coated fabrics. At p.3,1.9 et seq. the production of porous and non-porous coated fabrics is taught. At p.3,11.12-17 the use of, inter alia, a hydrophilic polymer to improve the water transmission rate of a non-porous polyurethane film is discussed.

Document D3 discloses polyurethane pastes for application to articles to produce water vapour permeable coatings. In the examples, a paste containing a dispersion of a polyacrylic acid is applied to polyamide, cotton, polyester and mixed polyamide/cotton fabrics. However the process as described in D3 would appear to yield a porous coating.

Novelty:- None of the documents cited in the International Search Report disclose the use of absorbent particles in non-porous water vapour permeable films. The Novelty of the subject-matter of the claims is therefore acknowledged.

Inventive Step:- In considering the presence of an Inventive Step the teaching of document D2 is taken to represent the closest prior art. As indicated above D2 at p.3,11.12-17 a wide variety of methods for improving the water vapour transmission rate (WVTR) of such films are discussed. The addition of absorbent particles is however not taught. The applicant has demonstrated that the addition of such particles leads to improved water vapour transmission properties. Thus the objective problem may be regarded as to produce non-porous water vapour permeable films with improved WVTR. The presence of may be acknowledged in that neither D2 taken in isolation nor in combination with the other documents cited would render it obvious to solve this problem by the addition of absorbent particles to such films.

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

(i) The units psi and oz/yd² expressed in the examples do not meet the requirements of Rule 10.1 (a) PCT and should be replaced by the appropriate SI units. The present expressions should, however, be retained in parentheses after the replacement expressions.

(ii) Certain terms used in the examples appear to be registered trade marks and should be identified as such.

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

- (i) The term "substantially insoluble" used in claim 1 is vague and indefinite and, as such, renders the scope of the claim unclear; accordingly, the claim requires amendment to remove this defect (Article 6 PCT).
- (ii) There is gross repetition of wording between certain of the claims which it may be possible to avoid by appropriate reordering of the claims and thus render the claims more concise.
- (iii) There is a discrepancy between the upper limit given for the level of incorporation of the absorbent particles in present claim 6 and the description at p.10,1.21 which should be resolved.
- (iv) It is clear from the tests given in the test procedures section of the application that the terms "waterproof" and "air impermeable" enjoy a particular interpretation within the context of the application. If these terms have any limiting effect on the claims then these definitions should also appear in the claims.
- (v) It is clear from the description at p.11 that the technical features of claim 8 are essential to the performance of the invention. Since independent claims 1 and 17 do not contain these features they do not meet the requirement following from Article 6 PCT taken in combination with Rule 6(3)(b) PCT that any independent claim must contain all the technical features essential to the invention.
- (vi) Claims 1,2 and 17 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not defined. The claims attempt to define the subject-matter in terms of the result to be achieved, i.e. that a certain WVTR be achieved. In this instance, however, such a formulation is not allowable because it seems possible to define the subject-matter in more concrete terms, viz. in

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terms of how the result is to be achieved, i.e. in terms of the nature and amounts of the absorbent particles that must be added.



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(substantive examination)

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(Formalities including
extension of time limits)

Assistant (0 89) 23 99- 8151
(other matters)

Application No./Patent No. 94923244.1-2115	Ref. K 32 129/3ba	Date 19.03.97
Applicant/Proprietor W.L. GORE & ASSOCIATES, INC.		

Communication pursuant to Article 96(2) and Rule 51(2) EPC

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable to correct the indicated deficiencies within a period

of 4 months

from the notification of this communication, this period being computed in accordance with Rules 78(3) and 83(2) and (4) EPC.

Amendments to the description, claims and drawings are to be filed where appropriate within the said period in three copies on separate sheets (Rule 36(1) EPC).

Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).



D. Hutton
Primary examiner
for the Examining Division

Communication despatched, EXRE and statistical data recorded

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I. Aperribay

Enclosures: 4 page/s reasons (Form 2906)

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Datum	Blatt	Anmelde-Nr.
Date	Sheet	Application No.: 94 923 244.1
Date	Feuille	Demande n°.

The examination is being carried out on the following application documents:

Description:

Pages 1-3.5-23 as originally filed

Pages 4 as filed with your letter of 21.12.95

Claims:

Nos. 1-19 filed with your letter of 21.12.95 and refiled with the entry into the European Regional Phase.

The following documents are considered relevant and will be designated as indicated throughout:-

- D1 = Database WPI Week 8635, Derwent Publications Ltd., London, GB; AN 229633
"Water Resistant Moisture Permeable Fabric Production", & JP-A-61 160 480 (Toray) 21 July 1986, * Abstract *.
- D2 = EP-A-0 523 806
- D3 = EP-A-0 193 808

An international Preliminary Examination Report has already been drawn up for the present application in accordance with the PCT. The deficiencies mentioned in that report give rise to objections under the corresponding provisions of the EPC.

1.0 Article 84 EPC.

- 1.1 The term "substantially insoluble" used in claim 1 is vague and indefinite and, as such, renders the scope of the claim unclear; accordingly, the claim requires amendment to remove this defect (Article 84 EPC).
- 1.2 There is gross repetition of wording between certain of the claims which it may be possible to avoid by appropriate reordering of the claims and thus render the claims more concise.

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- 1.3 There is a discrepancy between the upper limit given for the level of incorporation of the absorbent particles in present claim 6 and the description at p.10,1.21 which should be resolved.
- 1.4 It is clear from the tests given in the test procedures section of the application that the terms "waterproof" and "air impermeable" enjoy a particular interpretation within the context of the application. If these terms have any limiting effect on the claims then these definitions should also appear in the claims.
- 1.5 It is clear from the description at p.11 that the technical features of claim 8 are essential to the performance of the invention. Since independent claims 1 and 17 do not contain these features they do not meet the requirement following from Article 84 EPC taken in combination with Rules 29(1) and (3) EPC that any independent claim must contain all the technical features essential to the invention.
- 1.6 Claims 1,2 and 17 do not meet the requirements of Article 84 EPC in that the matter for which protection is sought is not defined. The claims attempt to define the subject-matter in terms of the result to be achieved, i.e. that a certain WVTR be achieved. In this instance, however, such a formulation is not allowable because it seems possible to define the subject-matter in more concrete terms, viz. in terms of how the result is to be achieved, i.e. in terms of the nature and amounts of the absorbent particles that must be added.
- 2.0 Novelty and the Cited Documents .
- Document D1 discloses the production water resistant, moisture permeable fabrics by applying a polyurethane resin containing an acrylic component and fine particles. The acrylic component is subsequently eluted

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to yield a porous membrane.

Document D2 describes various approaches to the preparation of moisture permeable and water proof coated fabrics. At p.3,1.9 et seq. the production of porous and non-porous coated fabrics is taught. At p.3,11.12-17 the use of, inter alia, a hydrophilic polymer to improve the water transmission rate of a non-porous polyurethane film is discussed. Document D3 discloses polyurethane pastes for application to articles to produce water vapour permeable coatings. In the examples, a paste containing a dispersion of a polyacrylic acid is applied to polyamide, cotton, polyester and mixed polyamide/cotton fabrics. However the process as described in D3 would appear to yield a porous coating. None of the documents cited in the International Search Report disclose the use of absorbent particles in non-porous water vapour permeable films. The Novelty of the subject-matter of the claims is therefore acknowledged.

3.0 Inventive Step.

In considering the presence of an Inventive Step the teaching of document D2 is taken to represent the closest prior art. As indicated above D2 at p.3,11.12-17 a wide variety of methods for improving the water vapour transmission rate (WVTR) of such films are discussed. The addition of absorbent particles is however not taught. The applicant has demonstrated that the addition of such particles leads to improved water vapour transmission properties. Thus the objective problem may be regarded as to produce non-porous water vapour permeable films with improved WVTR. The presence of may be acknowledged in that neither D2 taken in isolation nor in combination with the other documents

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cited would render it obvious to solve this problem by the addition of absorbent particles to such films.

4.0 Miscellaneous.

4.1 The units psi and oz/yd² expressed in the examples do not meet the requirements of Rule 35(12) EPC and should be replaced by the appropriate SI units. The present expressions should, however, be retained in parentheses after the replacement expressions.

4.2 Certain terms used in the examples appear to be registered trade marks and should be identified as such.

It would therefore appear that if the objections raised under sections 1.0 and 4.0 are overcome, the grant of a patent may be considered. To this end the Applicant is invited to submit new claims and an appropriately adapted description that meet the above points.

In doing so please take care not to amend the application in such a way that it contains subject-matter which extends beyond the content of the application as filed, Article 123(2) EPC.

Please file amendments by way of replacement pages, avoiding unnecessary recasting of the description. Account should also be taken of the requirements of Rule 36(1) EPC. In particular, fair copies of the amendments should be filed in triplicate. The Applicant is also kindly asked to state where (page/line) support for any amendments may be found in the Application as filed (the Guidelines E-II.1).

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