



VF Outdoor, LLC v. Cocona Inc.

U.S. Patent No. 8,945,287, IPR2018-00190

Patent Owner's Demonstratives for Oral Argument

The '287 Patent (Ex. 1001)

(12) United States Patent Haggquist	(10) Patent No.: US 8,945,287 B2 (45) Date of Patent: Feb. 3, 2015
(54) ACTIVE PARTICLE-ENHANCED MEMBRANE AND METHODS FOR MAKING AND USING THE SAME	(56) References Cited U.S. PATENT DOCUMENTS
(75) Inventor: Gregory W. Haggquist , Longmont, CO (US)	3,783,085 A 1/1974 Pearson et al. 3,817,211 A 6/1974 Brown et al. 3,865,758 A 2/1975 Yoshida et al. 4,004,324 A 1/1977 Bridge et al. 4,099,186 A 7/1978 Edwards et al. 4,175,055 A 11/1979 Goller et al.
(73) Assignee: Cocona, Inc. , Boulder, CO (US)	(Continued)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1036 days.	FOREIGN PATENT DOCUMENTS
(21) Appl. No.: 11/801,647	CN 1658948 8/2005 DE 2251 071 4/1973
(22) Filed: May 9, 2007	(Continued)
(65) Prior Publication Data US 2007/0264203 A1 Nov. 15, 2007	OTHER PUBLICATIONS International Search Report (PCT, Oct. 29, 2007). (Continued)
Related U.S. Application Data	<i>Primary Examiner</i> — Jason M Greene (74) <i>Attorney, Agent, or Firm</i> — Neugeboren O'Dowd PC
(60) Provisional application No. 60/799,426, filed on May 9, 2006.	(57) ABSTRACT The present disclosure relates to active particle-enhanced membrane and methods for making and using the same. In some embodiments, a breathable membrane includes a base material solution and active particles. The active particles incorporated in the membrane may improve or add various desirable properties to the membrane, such as for example, the moisture vapor transport capability, the odor adsorbance, the anti-static properties, or the stealth properties of the membrane. In some embodiments, the base material may exhibit water-proof properties when converted into non-solution state, and thereby result in a water-proof membrane. In some embodiments, the active particles may be protected from losing activity before, during, or after (or any combination thereof) the process of producing the membrane. The membrane may be applied to a substrate, or may be used independent of a substrate.
(51) Int. Cl. B01D 53/22 (2006.01) B01D 71/06 (2006.01) B01D 53/02 (2006.01)	
(52) U.S. Cl. USPC 96/4 ; 96/12; 96/154; 95/52; 95/141; 428/403; 428/407; 427/220	
(58) Field of Classification Search USPC 95/45, 52, 90, 141, 900, 901, 902; 96/4, 96/7, 8, 10, 11, 12, 108, 153, 154; 210/640, 641; 428/403, 404, 407; 424/617, 618, 630, 641; 427/212, 215, 427/220, 221	
See application file for complete search history.	62 Claims, 5 Drawing Sheets

27. A water-proof composition comprising:
a liquid-impermeable breathable cured base material comprising a first thickness;
a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness; and
wherein,
the first thickness comprises a thickness at least 2.5 times larger than the second thickness but less than an order of magnitude larger than the second thickness,
the active particles improve the moisture vapor transport capacity of the composition, and
a moisture vapor transmission rate of the water-proof composition comprises from about 600 g/m²/day to about 11000 g/m²/day.

Ex. 1001.

Claim Construction - Active Particles

Cocona	“particles that adsorb or trap substances on their surface”
TNF	“particles capable of causing chemical reactions at their surface <u>or capable of physical reactions</u> , including the ability to adsorb, absorb, or trap substances” Pet. at 13. (Emphasis added).
Board	“particles that have the capacity to cause chemical reactions at the surface <u>or physical reactions</u> , such as, adsorb or trap substances” Paper 14, Institution Decision at 10. (Emphasis added).

Claim Construction - Active Particles

Claim 27	TNF's Proposal
<p>A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material comprising a first thickness;</p> <p><u>a plurality of active particles</u> in contact with the liquid-impermeable breathable cured base material, <u>the plurality of active particles</u> comprising a second thickness...</p> <p>(Emphasis added).</p>	<p>A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material comprising a first thickness;</p> <p>a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness...</p> <p>Paper 12, POPR at 2.</p>

Claim Construction - Active Particles

5 These particles may provide such properties because they
are “active.” That is, the surface of these particles may be
active. Surface active particles are active because they have
the capacity to cause chemical reactions at the surface or
physical reactions, such as, adsorb or trap substances, includ-
10 ing substances that may themselves be a solid, liquid, gas or
any combination thereof. Examples of substances that may be

Ex. 1001 at 4:4-10.

limited to, pollen, water, butane, and ambient air. Certain
types of active particles (such as activated carbon) have an
adsorptive property because each particle has a large surface
area made up of a multitude of pores (e.g., pores on the order
of thousands, tens of thousands, or hundreds of thousands per
particle). It is these pores that provide the particle or, more
particularly, the surface of the particle with its activity (e.g.,
capacity to adsorb). For example, an active particle such as

Ex. 1001 at 4:12-20.

Claim Construction - Active Particles

[0004] These particles can provide such properties because they are “active”. Active particles are active because they have the capacity to adsorb or trap substances, including substances that may themselves be a solid, liquid, and/or gas, for example, pollen, water, butane, and ambient air. Active particles have an adsorptive property because each particle has a multitude of pores (e.g., pores on the order of thousands, tens of thousand, or hundreds of thousands per particle). It is these pores that provide the active particle with its capacity to adsorb. For example, an active particle such as activated carbon can adsorb a substance (e.g., butane) by trapping the substance in the pores of the activated carbon.

[0028] Active particles are particles that have pores or traps, and have the capacity to adsorb substances in solid, liquid, and/or gas phases, and combinations thereof. These pores can vary in size, shape, and quantity, depending on the type of active particle. For example, some particles naturally have pores, such as volcanic rock, and other particles such as carbon may be treated with extreme temperature and an activating agent such as oxygen to create the pores.

All cites to Ex. 1004, Haggquist.

[0029] Active particles are particles that can adsorb a substance or have the potential to adsorb a substance. Active particles can exist in a deactivated state. Although the pores of active particles may be blocked or inhibited from adsorbing a substance of certain molecular size in a deactivated state, this does not imply that these pores are permanently

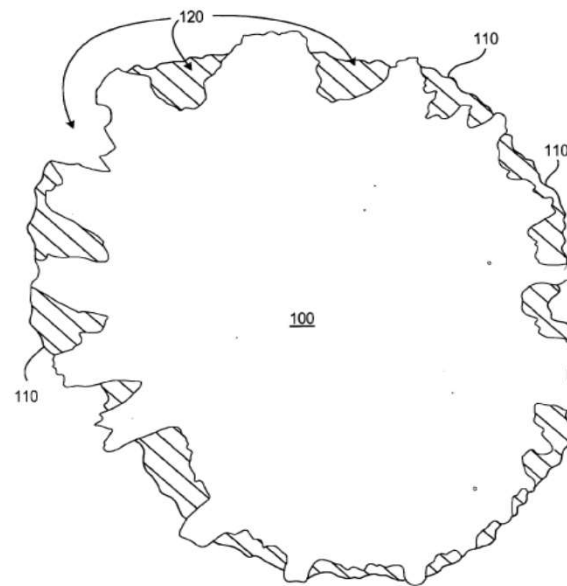


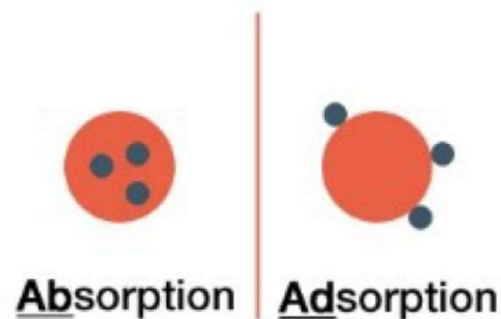
FIG. 1

Claim Construction - Active Particles

8. A POSITA understands that “active particles” are “active” because they have the ability to adsorb or trap substances at their surface. This surface-active property is the result of the large surface area of an active particle. The

10. A POSITA understands that absorption is a bulk process that is very different from the surface-active process of adsorption. More specifically, absorption is a bulk-process where a fluid or gas is dissolved by a liquid or solid.

11. The image below depicts the difference between the surface-active process of adsorption (shown on the right) and the bulk dissolution process of absorption (shown on the left).



All cites to Ex.
2001, Haggquist
Decl.

Claim Construction - Active Particles

60. The specification confirms that the “active particles” are surface-active particles that work by adsorbing or trapping substances on their surfaces. *See, e.g.*, Ex. 1001 at 2:56-59; 3:64-4:3, 4:4-21, 4:28-38, 5:1-10, 5:11-22, 5:25-33, 5:43-46, 5:59-6:3, 6:13-28, 8:10-12, 8:17-19; *see also* Ex. 1004 at Fig. 1, ¶¶ 4-5, 7, 28-29, 32, 37-38, 80, 84, 92, 99. In light of the description of active particles being described by their adsorptive properties throughout the specification, a POSITA would have understood that the “plurality of active particles” of claim 27 are characterized for the purposes of the claimed invention by their adsorptive properties.

Ex. 2006, Daniels Decl.

Claim Construction - Active Particles

22. The Petition argues for and depends on a proposed definition of the term “active particles” that would include any particle capable of a physical reaction. Cocona proposed that “active particles” as “particles that adsorb or trap substances on their surface.” Cocona’s proposed definition is the ordinary meaning in the plastics industry and the only definition that aligns with the specification.

33. A person of ordinary skill in the art reading the ‘287 Patent would understand that the reference to “chemical reactions at the surface or physical reactions” is a reference to “chemical or physical reactions at the surface,” but is just inartfully written. But to take the statement without the full context of the paragraph

29. In seven pages of text the ‘287 Patent uses the term “active particles” at least 112 times – having used the ordinary and customary meaning of the word “active” in view of the specification “activation 1. Basically it is any process whereby a substance is treated to develop adsorptive properties.” In seven pages of text of the ‘287 Patent refers to the activity levels, *i.e.*, the adsorptive property of the activated particles, 41 times. *See, e.g.*, Ex. 1001 at 4:4-21, 5:59-65; *see also* Ex. 1004 at ¶¶ 4-5, 7, 14, 28-29, 32, 37-38. There is nothing in the patent claims, specification, or prosecution history that would lead a person of ordinary skill in the art to include absorption within the definition of “active” or within the scope of the claims.

All cites to Ex. 2005, Callan Decl.

Claim Construction - First Thickness

Claim 27	<p>“A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material comprising a first thickness...”</p>
Cocona	<p>“first layer or membrane” POPR at 13.</p>
TNF	<p>“the thickness of the water-proof composition, which includes the base material and the active particles” Pet. at 11.</p>
Board	<p>“the thickness of a base material,’ which base material may include active particles.” ID at 12.</p>

Claim Construction - First Thickness

Claim 27	TNF's Proposal
A water-proof composition comprising: a liquid-impermeable breathable cured base material comprising <u>a first thickness</u> ; (Emphasis added).	A water-proof composition <u>comprising a first thickness</u> comprising: a liquid-impermeable breathable cured base material comprising a first thickness ; POPR at 17.

Claim Construction - First Thickness

27. A water-proof composition comprising:
a liquid-impermeable breathable cured base material comprising a first thickness;
a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness; and
wherein,

Ex. 1001.

state, and thereby result in a water-proof membrane. In some embodiments, the active particles may be protected from losing activity before, during, or after (or any combination thereof) the process of producing the membrane. The membrane may be applied to a substrate, or may be used independent of a substrate.

Ex. 1001, Abstract.

SUMMARY OF THE DISCLOSURE

The present disclosure relates to active particle-enhanced membrane and methods for making and using the same. The membrane can be a self-supporting membrane or a coating on a substrate. The present disclosure, while not limited as such,

Ex. 1001, 2:10-15.

In some embodiments, the membrane may include polyurethane and solid particles. The membrane may be applied to a substrate such as a woven, non-woven, ePTFE (treated or untreated) substrate, PTFE substrate, polyurethane substrate, or knit material, or may be used independent of a substrate. In

Ex. 1001, 2:42-46.

Claim Construction - First Thickness

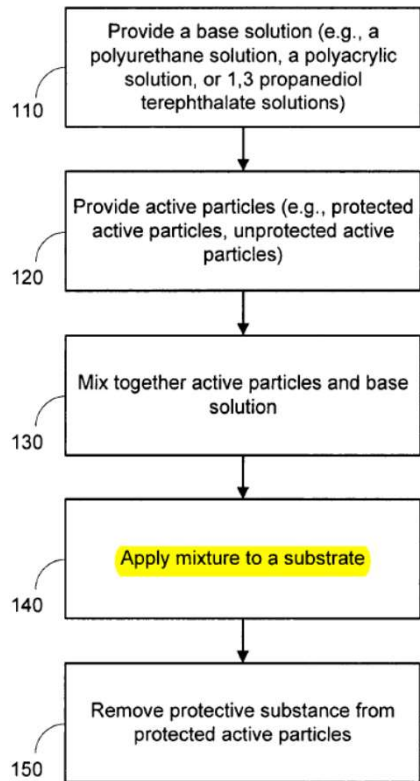


FIG. 1

At step 140, the mixture may be applied to a substrate such that the mixture forms a layer or film thereon, prior to being cured or being converted by other suitable means into a non-solution form. The substrate may be a substance for which the cured mixture is intended to be permanently affixed such as, for example, a woven, a non-woven, paper or knitted material. In some embodiments, the mixture may be converted into non-solution state and used as a laminate. In approaches for Ex. 1001, 7:10-17.

Claim Construction – First Thickness

Claim 27 of the '287 Patent recites a “**cured base material**,” which means a non-solution form of a substrate that was converted from a solution state via any conventional curing technique. (*Id.* at Col. 7:25-33.) This is consistent with how the '287 Patent defines “**cured base material**.” (*Id.* at Col. 3:38-40 & Col. 7:10-33; Ex. 1005 at ¶ 93.) Additionally, a POSITA would understand that the definition of “**cured base material**” encompasses a dried and heated polyurethane solution. (*Id.* at ¶ 114-116.)

Pet. at 10.

As discussed above, the “**cured base material**” means a non-solution form of a substrate that was converted from a solution state via any conventional curing technique.

Pet. at 33.

As discussed above, the “**cured base material**” means a non-solution form of a substrate that was converted from a solution state via any conventional curing

Pet. at 56.

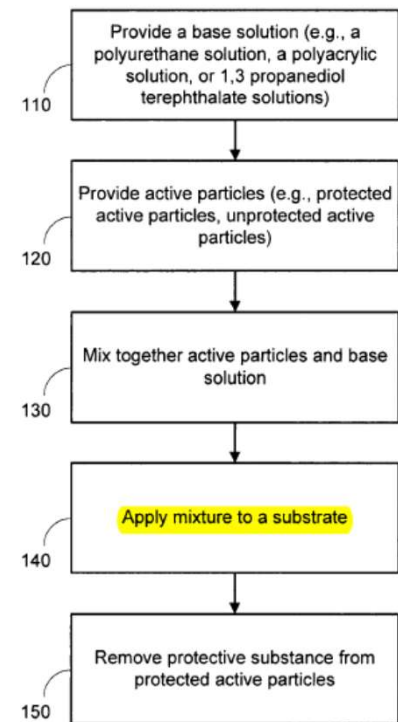


FIG. 1

Claim Construction – First Thickness

42. I must respectfully disagree with the Petitioner and the Board. Their constructions ignore the plain language of the claim and numerous embodiments in the specification of the '287 Patent. First, the Petition *admits* that the “cured base material” is the substrate to which a layer of active particles is applied. *See, e.g.*, Pet. at 10 (“Claim 27 of the '287 Patent recites a ‘cured base material,’ which means a non-solution form of a substrate that was converted from a solution state via any conventional curing technique.”) (Emphasis added). In other words, Petitioners acknowledge that claim 27 recites applying a layer of active particles (which may be carried in a solvent) on a “cured base material” or “substrate.” This aligns with a skill artisan’s understanding of claim 27 and the '287 Patent specification, as discussed above, and directly refutes Petitioner’s and the Board’s claim constructions for “first thickness” and “second thickness.” *See, e.g.*, '287 Patent at Ex. 2005, Callan Decl., at ¶ 42.

Claim 27 of the '287 Patent recites a “cured base material,” which means a non-solution form of a substrate that was converted from a solution state via any conventional curing technique. (*Id.* at Col. 7:25-33.) This is consistent with how the '287 Patent defines “cured base material.” (*Id.* at Col. 3:38-40 & Col. 7:10-33; Ex. 1005 at ¶ 93.) Additionally, a POSITA would understand that the definition of “cured base material” encompasses a dried and heated polyurethane solution. (*Id.* at ¶ 114-116.)

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Pet. at 33.

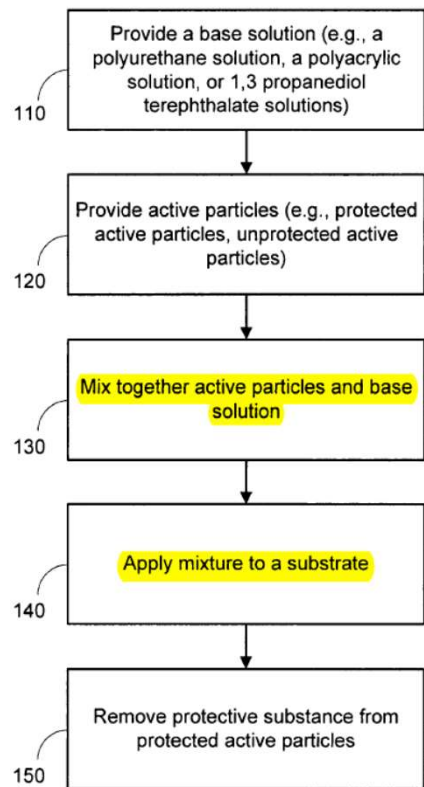
Claim Construction – Second Thickness

Claim 27	<p>A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material <u>comprising a first thickness</u>;</p> <p>a plurality of active particles in contact with the liquid-impermeable breathable cured base material, <u>the plurality of active particles comprising a second thickness...</u> (Emphasis added).</p>
Cocona	“second layer or membrane” POPR at 13.
TNF	“the particle size of the active particles” Pet. at 14.
Board	“‘the thickness of a plurality of active particles,’ which may be the particle size of the active particles.” ID at 13.

Claim Construction – Second Thickness

Claim 27	TNF's Proposal
<p>A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material comprising a first thickness;</p> <p>a plurality of active particles in contact with the liquid-impermeable breathable cured base material, <u>the plurality of active particles comprising a second thickness...</u></p> <p>(Emphasis added).</p>	<p>A water-proof composition comprising:</p> <p>a liquid-impermeable breathable cured base material comprising a first thickness;</p> <p>a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness <u>the particle size of the active particles...</u></p> <p>POPR at 17.</p>

Claim Construction - Second Thickness



At step 140, the mixture may be applied to a substrate such that the mixture forms a layer or film thereon, prior to being cured or being converted by other suitable means into a non-solution form. The substrate may be a substance for which the cured mixture is intended to be permanently affixed such as, for example, a woven, a non-woven, paper or knitted material. In some embodiments, the mixture may be converted into non-solution state and used as a laminate. In approaches for Ex. 1001, 7:10-17.

adhering to the cured mixture. The cured mixture may be referred to herein as a membrane. After coating the material the mixture is cured to provide a water proof breathable membrane. Ex. 1001, 7:21-22.

Claim Construction - Second Thickness

27. A water-proof composition comprising:
a liquid-impermeable breathable cured base material comprising a first thickness;
a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness; and
wherein,

Ex. 1001.

state, and thereby result in a water-proof membrane. In some embodiments, the active particles may be protected from losing activity before, during, or after (or any combination thereof) the process of producing the membrane. The membrane may be applied to a substrate, or may be used independent of a substrate.

Ex. 1001, Abstract.

SUMMARY OF THE DISCLOSURE

The present disclosure relates to active particle-enhanced membrane and methods for making and using the same. The membrane can be a self-supporting membrane or a coating on a substrate. The present disclosure, while not limited as such,

Ex. 1001, 2:10-15.

In some embodiments, the membrane may include polyurethane and solid particles. The membrane may be applied to a substrate such as a woven, non-woven, ePTFE (treated or untreated) substrate, PTFE substrate, polyurethane substrate, or knit material, or may be used independent of a substrate. In

Ex. 1001, 2:42-46.

Claim Construction - Second Thickness

28. The composition of claim 27, wherein the active particles comprise about 0% to about 75% of the total weight of the composition.

29. The composition of claim 27, wherein the active particles comprise about 30% to about 50% of the total weight of the composition.

30. The composition of claim 27, wherein the active particles comprise about 0% to about 30% of the total weight of the composition.

31. The composition of claim 27, wherein the active particles comprise about 25% to about 75% of the total weight of the composition.

32. The composition of claim 27, wherein the active particles comprise about 0% to about 50% of the total weight of the composition.

Ex. 1001.

- Q. The phrase "wherein the active particles," is that phrase referring to all of the particles together or just one particle?
- A. That phrase is referring to all the particles together.

Ex. 2007, 26:1-5.

At step 140, the mixture may be applied to a substrate such that the mixture forms a layer or film thereon, prior to being cured or being converted by other suitable means into a non-solution form. The substrate may be a substance for which the cured mixture is intended to be permanently affixed such as, for example, a woven, a non-woven, paper or knitted material. In some embodiments, the mixture may be converted into non-solution state and used as a laminate. In approaches for

Ex. 1001, 7:10-17.

Claim Construction – Second Thickness

74. The Board construed “second thickness” as “the thickness of a plurality of active particles,” which may be the particle size of the active particles.” Paper 14 at 13. While I agree that the “second thickness” includes the active particles, a POSITA would not interpret it as the size of a single particle. Doing so is inconsistent with the language of the claims and the ‘287 Patent. First, the plain language of the claim indicates that the “second thickness” is a dimension of the plurality of active particles, not of an individual particle. I understand that every word of a claim should be given meaning, and that it would not be correct to remove the word “plurality” from the claim. The Petitioner’s and the Board’s interpretation, however, removes the word “plurality” from the claim by treating the “second thickness” as the thickness of a single active particle. Nothing in the ‘287 Patent

Ex. 2006, at ¶ 74.

76. The ‘287 Patent clearly discloses active particles (which may be carried in “base solution”) in contact with a substrate or “cured base material.” See, e.g., *Id.* at 7:10-25 (discloses a base solution carrying active particles that forms a “layer or film” or “laminate” that can be applied to a substrate, and further explains that the cured active particle mixture can be called a “membrane”). That “layer or film” contains the plurality of active particles and has a physical dimension that can be readily measured as the “second thickness.” See, e.g., *Id.* at 7:20-21 (“The cured mixture may be referred to herein as a membrane.”).

Ex. 2006, at ¶ 76.

Claim Construction – Second Thickness

the claimed invention. Claim 27 clearly states that it is the plurality of active particles -- basically the layer with active particles, with or without a solvent -- that forms a second layer which is the second thickness. In other words, as a person of ordinary skill in the art would understand it, the plurality of active particles (alone or blended with a solvent) is added on top of the cured base layer. See, e.g., Haggquist at ¶¶67-72, 78; *id.* at claims 5, 11. The “plurality” of the active particles forms an additional layer with its own thickness, which is the “second thickness” referred to in the claim.

Ex. 2005, at ¶ 46.

47. A person of ordinary skill in the art would not understand this to indicate that the second thickness is the “particle size of the active particles” or even understand what that means. For one thing, “thickness” is not a term that a person of ordinary skill in the art would use to refer to particle size; we would use the term “diameter.” Moreover, if the Board intended “particle size of the active particles” ... formation. We are reading this in view of plastics and textile manufacturing facilities that existed at the time of patent application, which means the base material is cured to form a first layer, and the active particles are cured on top of the base material to form a second layer. That is the thickness that matters. Saying the

Ex. 2005, at ¶ 47.

Instituted Grounds for Review

Ground	Claims	Grounds
1	27, 28, 30, 32, and 36-37	Dutta (Ex. 1002)
2	27, 28, 30, 32, and 35-39	Dutta and Haggquist (Ex. 1004)
3	27, 28, 30, 32, 33, and 35-37	Halley (Ex. 1003)
4	38-39	Halley and Haggquist

Dutta (Ex. 1002)

One material of the invention is in the form of a waterproof, air permeable, 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-

Ex. 1002, 4:29-33.

The present invention provides for a continuous non-porous air impermeable polymer film with increased WVTR. The polymer film of this invention comprises of a polymer resin and hydrophilic absorbent particles such that the WVTR through the non-porous film of this invention is higher than that through a non-porous film of comparable thickness obtained only from the polymer resin.

Ex. 1002, 5:25-30

Dutta

by "hydrophilic absorbent" particles is meant that the particles absorb water.

Id. at 5:10-11.

The hydrophilic absorbent particles, as used in the present invention, are particles capable of swelling by absorbing a large volume of an aqueous liquid and assuming the form of a gel several times to several thousand times its own weight. The size of the absorbent-type

Id. at 9:15-18.

In addition to hydrophilic absorbent particles, the polymer used to make the films may contain other inert diluent particles as fillers. Talc, silica, calcium carbonate, carbon black, titanium dioxide, are examples of such filler particles. Additionally, the polymer can also contain

Id. at 9:36-10:1.

Dutta

permeable, water vapor permeable non-porous polymer film or sheet. *Dutta*

explicitly discloses that the MVTR of this membrane can be increased by

incorporating into it hydrophilic absorbent particles, such as Sephadex particles.

Pet. at 2.

Dutta

- “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.*” (*Id.* at p. 4:20-28 (emphasis added).)

- “For example, a layered arrangement of the polymer resin and the *absorbent particles* can be used to fabricate useful products.” (*Id.* at p. 12:26-27.)

▪ “Example 1B

To 36.8 grams of the *hydrophilic* polyurethane solution SOLUCOTE TOP 932, 1.55 grams (10 phr) of cross-linked dextran particles (*Sephadex* G-200-50

Id. at 22.

Dutta

- “When the absorbent particles are dispersed in a polymer resin, *the size of the particles plays an important role* in obtaining the polymer film of this invention. In order for the polymer film to be air impermeable, it is necessary that the hydrophilic absorbent particles are at least partially embedded in

Pet. at 24.

active particle. Dutta recites a plurality of active particles (absorbent-type particles or Sephadex particles) with a second thickness (particles sized from 0.1 to 300

Id. at 34.

Dutta

58. It is readily apparent from a review of Dutta that Dutta pertains to the use of super-hydrophilic, absorbent particles. These particles are the mechanism to drive Dutta's particular mode of water vapor transport, as, when they are exposed to moisture, they absorb the moisture, which causes them to swell. As these particles swell, they stretch their base material. And, as the base material stretches, it creates pores that allow the moisture to escape.

59. The Dutta Abstract, specification, and prosecution history clearly defines the Dutta Patent to only apply to products which contain hydrophilic absorbent particles. See (U.S. Patent Application PCT/US 94/07162 (Abstract)

60. The heart of the Dutta invention is the ability of the hydrophilic absorbent particles to absorb water. See Ex. 1002 at 5, ll. 10-11 ("by 'hydrophilic absorbent' particles is meant that the particles absorb water"); *id.* at 5, ll. 25-30. See also Ex. 2004 (Document 10: Reply to First Written Opinion at 4) ("The science

61. The super-hydrophilic, absorbent particles used in Dutta are particles that swell when exposed to moisture. See Ex. 1002 at 9, ll. 15-18 ("The hydrophilic absorbent particles, as used in the present invention, are particles capable of swelling by absorbing a large volume of an aqueous liquid and assuming the form of a gel several times to several thousand times its own weight."). As a person of ordinary skill in the art would understand, that is the mechanism by which Dutta works. The particles absorb moisture, swell, stretch the material, and – by their stretching – create pores in the material that allow the moisture/water to escape.

All cites to Ex. 2005.

Dutta

65. A person of ordinary skill in the art would understand that Sephadex is an absorptive particle that swells dramatically and absorbs 24 gm/gm of water as it swells. It is not an adsorptive particle.

66. Sephadex is known for its swelling, which is its effective quality as it pertains to the Dutta claimed invention. VF's Exhibit 1027, for example, describes this in detail:

- **“WHAT IS A SEPHADEX?** “Sephadex beads swell considerably in water and electrolyte solutions” and “The degree of swelling is an important characteristic of the gel.” (Ex. 1027 at 4)
- “The swollen gel is washed on a Buchner funnel with excess water to remove salt and contaminants. To shrink the gel, alcohol is then added at intervals under gentle suction. When the shrunken Sephadex has been sucked dry, it can be dried at 60 – 80 C. (Ex. 1027 at 31).

Ex. 2005.

Dutta

different sciences. The science of Dutta/Halley and the science of Haggquist work by fundamentally different mechanisms and are mutually-exclusive. A person of ordinary skill in the art would not substitute the super-hydrophilic swelling particles in Dutta and Halley with “inert” particles that Dutta and Halley identify as not swelling. A person of ordinary skill in the art at the time of invention would be discouraged from using non-swelling particles, since swelling is identified as the key characteristic in the Dutta and Halley particles. Everything about these references teaches that the combination should not be made.

Ex. 2005, ¶ 72.

Dutta

74. Dutta fails to disclose these elements as the elements are properly construed as discussed earlier in my declaration. Dutta does not disclose a liquid-impermeable cured base material solution comprising a first thickness; nor does it disclose a plurality of active particles in contact with that cured base material, “the plurality of active particles comprising a second thickness.” Ex. 1001 at Claim 27. Dutta does not disclose active particles at all, and teaches away from the use of active particles since they are categorized with every other type of particle (“inert” particles that are “fillers”) that is not absorbent. See Ex. 1002 at 9, l. 36 – 10, l. 1. To a person of ordinary skill in the art, “active particles” are particles that are treated to have adsorptive properties. See Ex. 2002 (Rosato’s *Plastics Encyclopedia and Dictionary* (1993)) at 8 (“activation 1. Basically it is any process whereby a substance is treated to develop adsorptive properties.”). Dutta does not teach or disclose this.

75. Dutta certainly does not teach or disclose a “plurality of active particles comprising a second thickness.” The entirety of Dutta is directed to super-hydrophilic, highly absorbent particles that swell to absorb water/moisture. That is the mechanism of the Dutta science. There is nothing about this that teaches adsorptive particles, adsorption, or using these as a second thickness to improve water transmission (or for any other purpose).

77. Sephadex particles disclosed are not active particles. They are highly absorptive particles that swell dramatically and, in the process, absorb 24 gm/gm of water. That is the basis of the Dutta science.

All cites to Ex. 2005.

Dutta

43. Adsorption and absorption require different materials to be active processes. Adsorption requires a material that has a large surface area in the form of pores. Materials such as activated carbon particles and porous aluminum oxide (alumina) can be activated by heat and chemical treatment to alter the surface chemistry to act as adsorbing species. Upon interaction with substances that adsorb, the base material does not change chemically. Contrastingly, an absorbing substance such as silica gel or a crosslinked polyacrylic acid substance imbibes a liquid such as water, causing the particles to swell microscopically to macroscopically. A significant volume change in the particles that absorb is frequently observed, both at the molecular level and at the macroscopic level, whereas in an adsorbing substance, volume changes are not seen.

All cites to Ex. 2006.

80. The fact that hydrophilic absorbent particles in Dutta absorb water is only half the story. The hydrophilic absorbent particles swell “to several thousand times their own weight” with water. See Dutta at 9:15-18 (“The hydrophilic absorbent particles, as used in the present invention, are particles capable of swelling by absorbing a large volume of an aqueous liquid and assuming the form of a gel several times to several thousand times its own weight.”) (Emphasis added). This swelling—or large change in particle size—is the key to how the invention of Dutta works. A POSITA understands that, in Dutta, the hydrophilic particles swell and thereby stretch the membrane, creating holes or channels that allow water vapor to move across the membrane. The fundamental science of Dutta relies on super-hydrophilic particles swelling with water to create holes in the membrane.

Dutta

89. Dutta actively teaches away from the '287 Patent in a number of aspects. First, a POSITA understands that the fundamental science behind Dutta leads away from the invention of the '287 Patent. Dutta relies on swelling hydrophilic absorbent particles to create holes in a membrane. See ¶ 79, above (citing Dutta at 9:15-18). Dutta actively discouraged the use of non-absorbent particles for the purpose of increasing WVTR.

90. Dutta teaches that non-absorbent particles are "inert" and play no role in water vapor transport. *Id.* This makes sense because non-absorbent particles would not swell and make holes in a membrane for increased water vapor transport. Dutta's characterization of non-absorbent particles as "inert" actively discourages a person of ordinary skill in the art from using non-absorbent particles. The "active particles" of the '287 Patent are surface-active adsorbent particles that trap water on their surface and do not absorb water to swell "to several thousand times [their] own weight" like the hydrophilic absorptive particles in Dutta.

All cites to Ex. 2006.

Dutta

92. Dr. Oelker's opinion that a person of ordinary skill would be motivated to combine Dutta and Haggquist, Ex. 1005 at ¶¶ 145-58, completely ignores the science behind Dutta, namely Dutta's use of swelling hydrophilic absorbent particles. See, e.g., Dutta at 9:15-18 ("The hydrophilic absorbent particles, as used in the present invention, are particles capable of swelling by absorbing a large volume of an aqueous liquid and assuming the form of a gel several times to several thousand times its own weight.") Dr. Oelker also fails to credit the clear teachings of Dutta that lead away from the use of "inert" or non-absorptive particles. Dutta at 9:36-10:1.

Ex. 2006.

Dutta

8 So I think in the context of this
9 specific sentence and in this specific
10 reference, they are talking about inert
11 meaning not necessarily influencing the MVTR
12 or WVTR, which was the point of this
13 disclosure.

Ex. 2007, 46:8-13.

2 And then likewise, Dutta considers
3 carbon black one of his inert particles; is
4 that correct?
5 A. That's -- yes, within the context of Dutta,
6 that's how he looks at it, apparently.

Ex. 2007, 48:2-6.

Halley (Ex. 1003)

WO 00/70975

PCT/US00/13904

3

According to the present invention, a particulate solid is incorporated into the water-vapour-permeable polymer, generally before the polymer coating is applied onto the substrate. A preferred particulate solid is carbon particles. Other particulate solids include inorganic particulate materials, pigments, metal
5 oxides, metal salts or metal particles. Further particulate solids include particles of titanium dioxide, zinc oxide, iron oxide, aluminium oxide, silica, talc, mica, tin or silver.

The polymer applied as a continuous coating to the substrate is
25 generally a water-vapour-permeable hydrophilic polymeric material which allows the passage of water vapour therethrough without being permeable to liquid water. Suitable polymers include hydrophilic polyurethanes, polyesters,

Ex. 1003, p. 2.

Halley

14. I have been informed that VF asserts that solid carbon particles such as “Black Pearls 2000 Carbon Black” are active particles. I disagree. A POSITA understands that particulate carbon, often referred to as “carbon soot” or “carbon black,” is not surface-active since it has not been processed to create the large number of pores necessary for surface-active chemistry. As explained in the ‘359 Application at paragraph 28, a POSITA understands that particulate carbon has to be specifically processed, such as by using high temperatures and an activating agent, to create pores for surface activity. See ‘359 Application at ¶ 28.

Ex. 2001.

Halley

different sciences. The science of Dutta/Halley and the science of Haggquist work by fundamentally different mechanisms and are mutually-exclusive. A person of ordinary skill in the art would not substitute the super-hydrophilic swelling particles in Dutta and Halley with “inert” particles that Dutta and Halley identify as not swelling. A person of ordinary skill in the art at the time of invention would be discouraged from using non-swelling particles, since swelling is identified as the key characteristic in the Dutta and Halley particles. Everything about these references teaches that the combination should not be made.

Ex. 2005, ¶ 72.

Halley

88. It should be plain to see, then, that Halley does not anticipate the '287 claimed invention. There is no disclosure of active (*i.e.*, adsorptive) particles and definitely no “plurality of active particles comprising a second thickness.” Ex. 1001 at Claim 27. The Halley science uses an absorption evaporation mechanism, akin to a painted window screen, whereas the '287 Patent uses active, adsorptive particles to trap substances in pores at the surface of the active particle and transport them out of the membrane. See Ex. 1001 at 4:4-21.

89. Also, contrary to statements by Petitioner, Halley's disclosure of particulate solids (including carbon particles) does not disclose the '287 invention. Carbon particles are not active particles. *Activated* carbon particles are active particles. Halley did not say “Activated Carbon Particles,” and active particles are expressly forbidden to be used as Halley's “particulate solids” by Patent 4,194,041, Ex. 1025 at 3:54-56.

Ex. 2005.

Halley

95. Second, also contrary to statements at the basis of the Petition and the Institution Decision, Halley does not use activated carbon. Halley is very specific to describe at Page 1, line 28 (Background of the Invention) “finely dispersed carbon particles, especially soot particles.” Soot is an amorphous form of carbon black, commonly known as Lamp Black. It is created by incomplete combustion of organic materials. Soot is not activated. I have firsthand experience with deformulations involving soot. Soot is not the same thing as activated carbon. Halley did not claim use of activated carbon in Patent WO 00/70975.

Ex. 2005.

Halley

96. Similarly, Aluminum Oxide, Silica Gel, Zinc Oxide, and Titanium Dioxide are common additives used in thousands of products throughout the polymer industry. Adding Aluminum Oxide, Silica Gel, Zinc Oxide and Titanium Dioxide to a polymeric formulation does not provide obviousness to a link between Halley and Haggquist. Aside from the fact that they are just basic additives, there is no teaching that would lead a person of ordinary skill in the art to use them to combine Halley and Haggquist. Moreover, the Halley technology itself would not be considered by a person of ordinary skill in the art trying to increase water vapor transmission properties/rates. Halley is about abrasion resistance; it teaches nothing about increasing or enhancing WVTR.

Ex. 2005.

Halley

98. It is my opinion that Halley does not disclose each element of Claims 27, 28, 30, 32, and 35-37 of the '287 Patent for at least the reason that Halley does not disclose "active particles," "first thickness," and "second thickness" as those terms are properly construed, nor does it disclose a composition where "active particles improve the moisture vapor transport capacity of the composition." First, contrary to statements by Dr. Oelker, *see* Ex. 1005 at ¶¶ 201-03, a POSITA reading Halley would understand that the carbon soot and other particles disclosed in Halley are *not* "active particles" as the term is properly construed, which is to mean "particles that adsorb or trap substances on their surface." With specific regard to the carbon (*e.g.* carbon black or soot) which is disclosed in Halley, which is called

Ex. 2006.

out by Dr. Oelker, this is not activated carbon and does not exhibit adsorptive properties. *Id.* at 7:17-20. Carbon and "activated carbon" are two very different things. Carbon (without activation) is not an active particle and does not adsorb or otherwise cause a reaction at the surface of the particle. Halley does not disclose or discuss any activation of particles, surface-active particles, or adsorption. Indeed, a POSITA understands that carbon soot is too small to be processed into activated carbon, and Dr. Oelker fails to acknowledge this highly-relevant fact.

Halley

99. Second, a POSITA would understand Halley, like Dutta, to involve hydrophilic matter (a hydrophilic coating) that operates solely by absorption and swelling, but with the addition of particulate solids added for strength and abrasion resistance. *See, e.g.*, Ex. 1003 at 2:24-27 (regarding the hydrophilic coatings); *id.* at 2:15-16, 3:1-7 (for addition of particulate solids for strength and abrasion resistance). None of the particulate solids disclosed in Halley is identified as “active” or “activated.”

Ex. 2006.

Halley

106. The idea that both Halley and Haggquist teach introducing particles to a substrate to enhance performance, and that that would make them compatible or make elements of their teachings interchangeable, is just wrong. Halley teaches a hydrophilic film used to transport water “solely by the absorption evaporation mechanism” with the addition of other (inert/non-active) particles for abrasion resistance. Haggquist teaches using active particles to transport water by adsorption. A POSITA with knowledge of these references at the time of the ‘287 invention would clearly understand that these are diametrically opposed scientific pathways and principles. To a polymer scientist, these are in the category of “never the twain shall meet.” There would not be a motivation to combine teachings between these references; in fact, there would be every motivation against combining these teachings.

Ex. 2006.

Halley

107. Moreover, there is no teaching or suggestion that substituting carbon black or soot with activated carbon would maintain the abrasion resistance properties taught by Halley. Ex. 1003 (“A preferred particulate solid is carbon particles”). There is no teaching or suggestion that Halley would work for its intended purpose if the inactivated carbon disclosed by Halley was swapped with activated carbon. Dr. Oelker’s report fails to provide *any* evidence or reasoning that Halley modified with activated carbon would work for its intended purpose, or that a POSITA would have a reasonable expectation of success for such a modification.

Ex. 2006.

Halley

108. Haggquist's teachings on encapsulants, in particular, would not be applied to Halley in order to improve water vapor transmission. Haggquist's encapsulants are intended to fill the surface pores of the active particles to prevent premature deactivation. Non-activated particles – *i.e.*, the absorbent particles in Halley – cannot be deactivated. It makes no sense to encapsulate something to protect it from premature deactivation, when it is/was not activated. Indeed, the non-activated particles of Halley would not have surface pores to fill according to the encapsulant process of Haggquist.

Ex. 2006.

Secondary Considerations

Commercial Success—Praise/Licensing

5. While I am not an attorney, I understand that the 2.5L technology licensed by Cocona to Certified Manufacturers corresponds to the novel features of '287 Patent. The novel features include a layer of active particles, such as activated carbon, printed or deposited on a base layer, with the thicknesses of the particle layer and the base layer conforming to a certain ratio. The novel features together provide a waterproof breathable membrane with improved characteristics including improved water vapor transport, breathability, and comfort for the end user. Exhibit 2031 is a technical paper describing the benefits of the 2.5L technology. It is my understanding that the demand for the 2.5L technology is driven by the improved characteristics provided by these novel features.

Ex. 2012.

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

FlashDry will be sold both as a wicking-type solution for base layer clothing as well as in a Gore-Tex type system for jackets. It will come in a fiber-level additive or treatment for clothing where micro-porous particles will do the moving of moisture. For jackets, the company will use FlashDry in a laminate, creating a waterproof/breathable shield for Gore-Tex-like performance but greater breathability, the company cites. In an interview, Todd Spaletto, president of The North Face, told me FlashDry was one of the "biggest innovations in the history of the company."

Ex. 2016.

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

This is the Men's Apex Lite Jacket from The North Face.

Why We Love It: Every athlete should own this jacket. It acts as a second skin, with body-mapped ventilation and North Face's FlashDry technology that wicks sweat and moisture away from the skin, through the fabric, and eliminates it. This means the FlashDry fabric dries quicker and more efficiently, and will keep you from getting clammy in cold conditions.

Ex. 2018

The porous particles work with your body to regulate temperature by accelerating moisture removal and dramatically improving dry time. When worn together with other items in the collection, such as a baselayer or jacket, the dry time is even faster than when wearing alone.

Ex. 2014

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

At 12,000 feet in Rocky Mountain National Park, with 40+ mph winds and driving snow, this jacket felt completely windproof over just a base layer. And the 2.5-layer Cocona Xcelerator fabric proved fully waterproof, keeping our tester warm and dry during a winter day in Oregon (read: 30°F and wet, wet, wet).

Ex. 2020

whole lot more sense. This Stratos H2O Jacket is in their Altium line, meaning it is the top-end MTB jacket. They describe it as an "extreme wet weather jacket with technical features designed for the rigors of trail riding." It's made of breathable Cocona Xcelerator fabric, bonded together at the seams to create a jacket rated for whatever nature throws at you. It's light enough to fold into a backpack and is covered with useful features, like scuff guards on the sleeves, a removable hood and even a little plastic window to view your watch. MSRP \$399.99 www.mavic.com

Ex. 2021

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

Sierra Designs was one of the original eco-conscious outdoor companies and they continue this trend with their new Xcelerator technology from Cocona. Any product on the market is going to have an environmental footprint but it is good to see some innovative solutions that don't sacrifice performance but rather enhance it. I found that the Sierra Designs Sonic Outlaw soft shell Jacket was indeed super warm and could easily be worn as a stand alone exterior layer for backcountry skiing or resort skiing thanks to it's durable finish and included powder skirt. I am

Ex. 2023

This promotes rapid moisture transfer and "xcelerated" evaporation. Polaris boasts that Cocona Xcelerator technology transfers moisture for rapid evaporation faster than any other fabric, and its breathability is competitive with that of any other fabric on the market.

Ex. 2024

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

(EX1044, ¶102.) PO admitted as much in litigation in its interrogatory responses, Paper 33 at 26.

stating or implying that neither PO nor its licensees practice the claims of the '287

patent. (EX1052, at 21-22 (Pl.'s Resps. to Interrogs. 13, 14).)

2 A. Yes, we haven't licensed anybody since
3 February 2013, although there are three licensees that
4 are currently making the product. They were licensed
5 before -- prior to February 2015. So that piece of it
6 is accurate. Had made, used -- so I use this product
7 here, and I'm a Cocona employee. I guess it depends
8 on how you define "used," but we don't sell fabrics,
9 and we don't sell garments, and we don't typically
10 have things made for us. The brands do. They go to
11 manufacture.

Ex. 1045 at 44:2-11.

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

6. Cocona's Certified Manufacturers have made 2.5L material for the

following brands:

Licensee Brand	Licensing Status
TNF	Past
TNF International Affiliates	Past
Abacus	Current
Adidas	Past
Adidas EU	Past
Bailo SPA	Past
Billabong	Past
Crux	Past
Cutter & Buck	Past
Cuun	Past
CW-X	Past
CW-X / Wacoal	Past
Dakine	Past
Eddie Bauer	Current
Eider	Past
Fechheimer	Current

Ex. 2012, ¶ 6.

Licensee Brand	Licensing Status
Fineside	Past
Firstgear	Licensee Brand
FirstLite	Planet Earth
Frankonia	Playbrave
Globetrotter	Polaris
Harley Davidson	Quicksilver
Helley Hansen, Japan	Rain Diva
Henri Lloyd	Ride Snowboards
Homeschool Snowboarding	Rip Curl
Isis	Rossignol
Kaikialla	RYU
Karrimor	Salomon
Kwintet	Salomon SA Europe
La Sportiva	Showers Pass
Marmot	Snickers
Marubeni Corporation	Sprayway
Mavic	Spyder
Millet	Sun Mountain
New Balance	TOG 24
Nitro	Trek
NULL	Triple 2
Oakley Japan	Tucker Rocky
Obermeyer	Turbella
OMM	Under Armour
Ozark	Wiggle
Pactimo	
Pearl Izumi	

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

arriving at the claimed subject matter. (Ex. 1005 at ¶¶ 138-184.) Additionally,

Petitioner is not aware of any secondary considerations that would render claims

27, 28, 30, 32, and 35-39 of the '287 Patent non-obvious. (*Id.* at ¶ 137). The

Pet. at 37.

39. (*Id.* at 221-234) Petitioner is not aware of any secondary considerations that

would render claims 38-39 of the '287 Patent non-obvious. (Ex. 1005 at ¶ 219.)

Pet. at 64.

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

6. Cocona's Certified Manufacturers have made 2.5L material for the following brands:

Licensee Brand	Licensing Status
TNF	Past
TNF International Affiliates	Past

Ex. 2012.

Secondary Considerations

Commercial Success—Praise/Licensing (cont.)

14. After the application for the '287 Patent was filed and product practicing claim 27 was made, Cocona shared the novel features of the '287 Patent with TNF. We showed TNF the first functional print on a membrane that overcomes thickness issues and increases the performance of the membrane. The resultant 2.5L provided a dry touch, a more comfortable microclimate, higher effective moisture vapor transport, and a durable 2.5L laminate.

15. I developed demonstrations and test methods to show the effect of these novel features of claim 27 of the '287 Patent to TNF, including but not limited to the first thickness, second thickness, and active particles of claim 27.

16. TNF loved the product, and agreed to license Cocona's technology, which matured into the '287 Patent. In fact, TNF was enamored enough with Cocona's technology that TNF launched the FlashDry brand in 2011. Cocona gave permission to TNF to use the FlashDry trademark so long as TNF only used Cocona technology under that brand and also stated that FlashDry was powered by Cocona.

17. The FlashDry product line launched with great success in the market place, and great reviews followed. The 2.5L laminate raised the industry standard for comfort and performance and embodies the novel features of claim 27 of the '287 Patent.

Ex. 2011

Secondary Considerations - Copying

COCONA, INC. V. VF OUTDOOR, LLC

CASE NO. 1:16-CV-2703 CMA

INFRINGEMENT CLAIM CHART FOR U.S. PATENT NO. 8,945,287 B2

CLAIM NO.	'287 CLAIM LANGUAGE	INFRINGING PRODUCTS
		<p>Cocona, Inc. ("Cocona") presently contends that the Infringing Products¹ are marketed and sold by VF Outdoor, LLC ("VF Outdoor") under The North Face ("TNF") brand. The Infringing Products literally infringe at least the claims of U.S. Patent No. 8,945,287 B2 (the "'287 Patent") asserted herein. Nevertheless, with respect to any claim limitation that may be found not to be literally infringed, Cocona contends in the alternative that the Infringing Products infringe such claim limitations under the doctrine of equivalents and that any element not found to be literally met is equivalently met because any difference between the claim limitation and the Infringing Product is not a substantial difference. Accordingly, Cocona contends that any asserted claim that the Infringing Products are not found to infringe literally is nevertheless embodied by the Infringing Products under the doctrine of equivalents under an operative doctrine of equivalents test (e.g. insubstantial differences).</p> <p>To the extent that a third party performs or contributes to infringement of any asserted claim, Cocona contends that all asserted claims are infringed by VF Outdoor under traditional theories of joint and several liability in the context of tort law.</p> <p>Cocona contends that VF Outdoor infringes Claims 27, 35, 36, and 37² by making, selling, and offering to sell clothing products that incorporate a fabric with a 2.5 layer construction marketed by VF Outdoor and/or TNF under the name DryVent™ 2.5L (each an "Infringing Product" as more specifically set forth in Ex. A). DryVent™ 2.5L fabrics are</p>

¹ Cocona identifies each of the Infringing Products in Ex. A.

² Cocona expressly reserves the right to assert additional claims of the '287 Patent in the future based on information learned during discovery and/or following the issuance of a claim construction Order.

VF Exhibit 1026 - 1/93

VF Improperly Presents New Arguments and New Evidence on Reply

Original Claim Construction	New Claim Construction on Reply
“... ‘active particles’ means particles capable of causing chemical reactions at their surface or capable of physical reactions, including the ability to adsorb, absorb, or trap substances.” Pet. at 13.	“Particles are ‘active’ because they impart various enhancing properties to membranes.” Paper 33 at 2.

VF New Arguments / Evidence (cont.)

PO's proposed "two-layer" construction is premised on equating the cured base material with the "substrate" upon which active particles are applied. (Paper Paper 33, Reply.

Claim 27 of the '287 Patent recites a "**cured base material**," which means a non-solution form of a substrate that was converted from a solution state via any conventional curing technique. (*Id.* at Col. 7:25-33.) This is consistent with how the '287 Patent defines "**cured base material**." (*Id.* at Col. 3:38-40 & Col. 7:10-33; Ex. 1005 at ¶ 93.) Additionally, a POSITA would understand that the definition of "**cured base material**" encompasses a dried and heated polyurethane solution. (*Id.* at ¶ 114-116.)

Pet at 10.

VF New Arguments / Evidence (cont.)

Original Theory

active particle. *Halley* discloses a plurality of active particles (particulates) have a
Pet. at 57.

a plurality of active particles in contact with the liquid-impermeable breathable cured base material,	<p><u><i>Halley</i></u></p> <ul style="list-style-type: none"> • “According to the present invention, a particulate solid is incorporated into the water-vapour-permeable polymer, generally before the polymer coating is applied onto the substrate. A preferred particulate solid is carbon particles. Other particulate solids include inorganic particulate materials, pigments, metal oxides, metal salts or metal particles. Further particulate solids include particles of titanium dioxide, zinc oxide, iron oxide, aluminum oxide, silica, talc, mica, tin or silver.” (<i>Id.</i> at p. 3:1-7.)
the plurality of active particles comprising a second thickness;	<p><u><i>Halley</i></u></p> <ul style="list-style-type: none"> • “The primary particle size of the particulate solid has been found to be of particular significance in the present invention. The primary particle size is

Pet. at 51.

New Theory / Evidence

permeable polymer.” (EX1003, 3:1-2.) A POSITA would recognize that *Halley*’s Black Pearls 2000 are “active particles” because they improve MVTR when incorporated into a polymer coating. (EX1044, ¶68.) PO’s reliance on the ’041

Paper 33 at 17.

¶203; EX1028, at 284.) For instance, *Wang* analyzed Black Pearls 2000, which were shown to have a surface area of 1501.8 m²/g and a pore volume of 2.67 cm³/g, revealing “larger pore volume as compared to Acetylene Black,” and leading *Wang* to conclude that this increased porosity creates a “high surface area and capability to adsorb water.” (EX1051, at 4911.) Thus, a POSITA would have recognized

Paper 33 at 18.