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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VF OUTDOOR, LLC,
Petitioner,

v.

COCONA, INC.,
Patent Owner.

Case No.: Unassigned
Patent No.: 8,945,287

PETITION FOR *INTER PARTES* REVIEW OF PATENT NO. 8,945,287

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VF Outdoor, LLC ("Petitioner" or "VF") respectfully submits this Petition for *Inter Partes* Review ("IPR") of claims 27, 28, 30, 32, 33, and 35-39 of U.S. Patent No. 8,945,287 ("the '287 Patent") (Ex. 1001) pursuant to 35 U.S.C. §§ 311-319 and 37 C.F.R. § 42.100 *et seq*.

I. INTRODUCTION

The inventors of the '287 Patent purport to have invented adding active particles to a membrane to improve its moisture vapor transmission rate (MVTR). Not surprisingly, inventors at W. L. Gore & Associates, Inc. and their affiliates ("Gore"), the manufacturers of the famous GORE- TEX® line of breathable materials, invented this technology over ten (10) years earlier. For example, Gore inventors disclosed adding active particles to membranes to improve their MVTR in WO 1995/033007 to Dutta ("*Dutta*") and again in WO 2000/70975 to Halley et al. ("*Halley*"). The claims are invalid as anticipated or obvious over the Gore references, and should be declared unpatentable.

The claims at issue in this IPR are directed to a water-proof composition comprised of a liquid-impermeable breathable cured based material with a first thickness and a plurality of active particles with a second thickness in contact with the liquid-impermeable breathable cured base material. The claims further require that the first thickness be at least 2.5 times larger than the second thickness, but less than an order of magnitude (10x) larger than the second thickness.

Additionally, the claims require that the active particles improve the moisture vapor transport capacity of the composition and provide a MVTR from about 600 $g/m^2/day$ to 11000 $g/m^2/day$. (*Id*.)

The claims at issue should be invalidated as anticipated and/or obvious. The exact claimed water-proof composition was disclosed in *Dutta* as a waterproof, air 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. Moreover, *Dutta* explicitly discloses the claimed thickness limitations between the hydrophilic particles and the membrane.

Additionally, the exact claimed water-proof composition was also disclosed in *Halley* as a lightweight, waterproof water-vapour-permeable material. *Halley* explicitly discloses that the MVTR of the material can be increased by adding carbon particles to it. Moreover, *Halley* explicitly discloses the claimed thickness limitations.

To the extent that the Patent Owner contests that *Dutta* discloses active particles, U.S. Patent Publication No. 2004/0018359 to Haggquist ("*Haggquist*") (which is 35 U.S.C. § 102(b) prior art to the '287 Patent, incorporated by reference into the '287 Patent, and has the same inventor as the '287 Patent) discloses the use of the same active particles as disclosed in the '287 Patent to provide enhanced

moisture management and other relevant properties to a material. *Haggquist* further teaches that the activity of these particles can be protected through use of a removable encapsulant. As such, *Haggquist* in combination with *Dutta* or *Halley* renders the '287 Patent obvious.

Accordingly, claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent are anticipated and/or obvious in view of the prior art. The prior art discloses, and a person of ordinary skill in the art ("POSITA") would have known that active particles can be utilized to increase the MVTR of a substrate. Therefore, Petitioner asserts four grounds for invalidity: (1) claims 27, 28, 30, 32, and 36-37 are anticipated by *Dutta*; (2) claims 27, 28, 30, 32, and 35-39 are obvious over *Dutta* in view of *Haggquist*; (3) claims 27, 28, 30, 32, 33, and 35-37 are anticipated by *Halley*; and (2) claims 38-39 are obvious over *Halley* in view of *Haggquist*.

II. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8(a)(1)

A. Real Party-In-Interest Under 37 C.F.R. § 42.8(b)(1)

Petitioner certifies that VF (which owns and operates The North Face brand) and VF Corporation are the real parties-in-interest (collectively, "RPI"). The RPI certifies the following information:

VF is a limited liability company. VF is a wholly owned subsidiary of VF Corporation. VF Corporation is a corporation.

B. Related Matters Under 37 C.F.R. § 42.8(b)(2)

Claims 27, and 35-39 of the '287 Patent are the subject of a patent infringement lawsuit brought by the Patent Owner originally against VF Corporation in *Cocona, Inc. v. Columbia Sportswear Company and V.F. Corporation*, Civil Action No. 1:16-cv-2703-CMA, filed in the U.S. District Court of Colorado on November 2, 2016 ("Litigation"). This complaint was served on VF Corporation on November 17, 2016. Cocona has since twice amended this complaint to remove Columbia Sportswear Company as a party and to change the named defendant from VF Corporation to VF. The amended complaint naming VF was served on VF on December 7, 2016.

C. Lead And Back-Up Counsel Under 37 C.F.R. §§ 42.8(b)(3) & 42.10(a)

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Pursuant to 37 C.F.R. § 42.10(b), a Power of Attorney is provided herewith.

D. Service Information Under 37 C.F.R. § 42.8(b)(4)

Service information for lead and back-up counsel is provided above in the designation of lead and back-up counsel. Petitioner also consents to electronic service by e-mail at VF@merchantgould.com.

III. PAYMENT OF FEES UNDER 37 C.F.R. § 42.103

Payment of $23,000 for the fees set forth in 37 C.F.R. § 42.15(a)(1-2) accompanies this Petition. The USPTO is authorized to charge Deposit Account No. 13-2725 for any additional fees that may be due for this Petition.

IV. REQUIREMENTS FOR IPR UNDER 37 C.F.R. § 42.104

A. Grounds For Standing Under 37 C.F.R. § 42.104(a)

Petitioner hereby certifies that the ’287 Patent is available for IPR and that neither Petitioner nor any RPI is barred or estopped from requesting IPR of the ’287 Patent because: (1) neither Petitioner nor any RPI are the patent owner; (2) neither Petitioner nor any RPI has filed a civil action challenging the validity of a claim in the ’287 Patent; (3) Petitioner hereby certifies that this Petition has been timely filed within the one year bar date set forth in 37 C.F.R. § 42.101(b); (4) the estoppel provisions of 35 U.S.C. § 315(e)(1) do not prohibit this IPR; and (5) the patent is not described in § 3(n)(1) of the Leahy-Smith America Invents Act and so is available for IPR pursuant to 37 C.F.R. § 42.102(a)(2).

B. Identification Of Challenge Under 37 C.F.R. § 42.104(b) And Relief Requested

Petitioner requests the cancellation of claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent as unpatentable over the prior art for the reasons given herein.

1. Claims For Which IPR Is Requested Under 37 C.F.R. § 42.104(b)(1)

Petitioner requests IPR of claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent.

2. Specific Art And Statutory Grounds On Which The Challenge Is Based Under 37 C.F.R. § 42.104(b)(2)

IPR of the '287 Patent is requested in view of the following three publications: (1) WO 1995/033007 to Dutta et al. ("*Dutta*") (Ex. 1002); (2) WO 2000/70975 to Halley et al. ("*Halley*") (Ex. 1003); and (3) U.S. Patent Publication No. 2004/0018359 to Haggquist ("*Haggquist*") (Ex. 1004). *Dutta* and *Halley* were not made of record during prosecution of the '287 Patent.

Each of the publications listed above is available as prior art against the '287 Patent under pre-AIA 35 U.S.C. § 102(b) because each was published more than one year before May 9, 2006, the filing date of the provisional application to which the '287 Patent claims priority. Specifically, (1) *Dutta* was published on December 7, 1995; (2) *Halley* was published on November 30, 2000; and (3) *Haggquist* was published on January 29, 2004.

The following combinations of the above-listed publications render claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent anticipated and/or obvious under pre-AIA 35 U.S.C. § 102(b) and pre-AIA 35 U.S.C. § 103(a):

Ground	Proposed Statutory Rejections
1	Claims 27, 28, 30, 32, and 36-37 of the '287 Patent are anticipated under 35 U.S.C. §102(b) by Dutta.
2	Claims 27, 28, 30, 32, and 35-39 of the '287 Patent are obvious under 35 U.S.C. §103(a) over Dutta in view of Haggquist.
3	Claims 27, 28, 30, 32, 33, and 35-37 of the '287 Patent are anticipated under 35 U.S.C. §102(b) by Halley.
4	Claims 38-39 of the '287 Patent are obvious under 35 U.S.C. §103(a) over Halley in view of Haggquist.

Copies of *Dutta*, *Halley*, and *Haggquist* are filed herewith. The above grounds for unpatentability are supported by the Declaration of Abigail Oelker, Ph.D. ("Oelker Decl.") (Ex. 1005), which is filed herewith.

3. The Construction Of The Challenged Claims Under 37 C.F.R. § 42.104(b)(3)

The terms of the '287 Patent claims are to be given their broadest reasonable interpretation in light of the specification, as understood by a POSITA. *See* 37 C.F.R. § 42.100(b). Petitioner submits, for purposes of the IPR only, the constructions given in Section V.C. below. Any claim terms not discussed herein should be given their "ordinary meaning" under the "broadest reasonable interpretation" standard of § 42.100(b).

4. How The Construed Claims Are Unpatentable Under 37 C.F.R. § 42.104(b)(4)

Section VI below contains a detailed explanation of how the construed claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent are unpatentable, including an identification of where each element is found in the prior art.

5. Supporting Evidence Under 37 C.F.R. § 42.104(b)(5)

The exhibit numbers of the supporting evidence relied upon to support Petitioner's challenge as to claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent and the relevance of the evidence to the unpatentability arguments raised, including the specific portions of the evidence that support Petitioner's challenge, are set forth in Section VI. This includes Exhibit 1005, which is a Declaration of Abigail Oelker, Ph.D. under 37 C.F.R. § 42.63(a) attesting to, among other issues, the invalidity of claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent, including the basis for the proposed grounds of unpatentability under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) and the reasons for combining the references relied upon in this Petition under 35 U.S.C. § 103(a) as discussed herein.

V. SUMMARY OF THE '287 PATENT

A. Lineage Of The '287 Patent

The '287 Patent, entitled "Active Particle-Enhanced Membrane and Methods for Making and Using the Same," issued on February 3, 2015 from U.S. Patent Application No. 11/801,647, filed on May 9, 2007, which claimed priority to U.S.

Provisional Application No. 60/799,426, filed on May 9, 2006. (Ex. 1001.)

B. Description Of The Alleged Invention Of The '287 Patent

The '287 Patent is directed to active particle-enhanced membranes and methods for making the using the same. (*Id.*, Abstract.) In the background, the '287 Patent cites that garments made from water-proof non-breathable materials (e.g., rubber) may seem "hot and humid" to the wearer because they do not permit moisture vapor to escape from within the garment to the outside environment. (*Id.* at Col. 1:43-47).

The '287 Patent discloses that incorporating active particles in the membrane of a water-proof material may improve or add various desirable properties to the membrane, such as moisture vapor transport capability. (*Id.* at Col. 2:24-28.) However, the '287 Patent admits that active particles and their properties were well-known:

> ***It is well-known*** that certain particles may be used to add performance properties to materials in different forms such as gases, liquids, and solids. These particles may have properties that are suitable for ***odor adsorption***, ***moisture management***, ultraviolet light protection, chemical protection, bio-hazard protection, fire retardance, anti-bacterial protection, anti-viral protection, anti-fungal protection, anti-microbial protection, and other factors, and combinations thereof.

(*Id.* at Cols. 3:63-67; 4:1-3 (emphasis added).)

C. Construction Of Key Terms In The ’287 Claims

For the purposes of this IPR, the Petitioner analyzes the claims using the below constructions for each disputed claim term.

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.)

Claim 27 of the ’287 Patent recites a liquid-impermeable breathable cured base material including “**a first thickness**.” The first thickness of the liquid-impermeable breathable cured base material is not discussed in the specification and is, therefore, not defined. However, the first thickness was explicitly discussed and defined during the prosecution history in the Response filed on June 5, 2013 to provide support for an added amendment. (Ex. 1007 at 17.) In the Response filed on June 5, 2013, the Applicant recites that “[s]upport for these claim amendments may be found at, for example, Paragraph 0049, which states that the Example 1 membrane comprises a thickness of about l mil, or about 25.4 microns (the first thickness).” (*Id.*) However, the membrane referred to in Example 1 includes both

the base material and the active particles based on the disclosure in the ’287 Patent. (Ex. 1001 at Col. 8:51-61.) Accordingly, the Applicant equates the thickness of the entire composition with the first thickness. As such, “**first thickness**” means the thickness of the water-proof composition, which includes the base material and the active particles. (Ex. 1005 at ¶¶ 94-96.) Further, this definition is consistent with the disclosure in the ’287 Patent concerning the process for making these compositions. (Ex. 1001 at Col. 8:54-66; Ex. 1005 at ¶ 96.)

Claims 27, 28, 30, 32, 33, and 35-38 of the ’287 Patent recite a plurality of “active particles.” The ’287 Patent recites:

> 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, including substances that may themselves be a solid, liquid, gas or any combination thereof***.

(Ex. 1001 at Col. 4:4-10 (emphasis added).) Further, the ’287 Patent recites:

> The present disclosure relates to ***active particle-enhanced membrane*** and methods for making and using the same. …The present disclosure is also particularly applicable to quick-drying, ***odor-absorbing***, anti-static ***membranes*** …and methods for making and using the same.

(*Id.* at Col. 2:10-22.) Additionally, the '287 patent recites that "[a]ctive particles may include, but are not limited to, activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester Cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and other suitable materials." (Ex. 1001 at Col. 4:22-27.)

The specification of the '287 Patent includes the disclosure of *Haggquist* (Ex. 1004), since the '287 Patent incorporates *Haggquist* in its entirety by reference. (Ex. 1001 at Col. 6:65-61.) *Haggquist* (Ex. 1004) states that "[a]ctive 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." (*Id.* at ¶ 4.) Further, claim 1 of *Haggquist* claims "[a]n encapsulated active particle comprising an active particle that is at least partially encapsulated by at least one encapsulant that inhibits ***absorption by said active particle***." (Ex. 1004 at claim 1 (emphasis added).) Additionally, *Haggquist* states that "the ***particles*** can deactivate before having an opportunity to adsorb desirable substances. Premature deactivation can include deactivation on account of ***absorption occurring at an undesirably early time*** whether or not the absorbed substance was deleterious, non-deleterious or even the intended target." (*Id.* at ¶ 14 (emphasis added).) As such, *Haggquist* teaches that the

active particles are capable of absorption, which could lead to their deactivation. (*Id.* at ¶ 14.)

Given that a claim term is given the broadest reasonable interpretation in view of the specification, the definition of "**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. (Ex. 1005 at ¶ 97-100.) This definition includes all of the specific active particles listed in the '287 Patent and in *Haggquist*.

Further the definition of active particles cannot be limited to adsorptive particles, since the '287 Patent discloses other activity in addition to adsorption. (Ex. 1001 at Col. 6:4-10; Ex. 1005 at ¶ 100.)

Claim 27 of the '287 Patent recites a plurality of active particles comprising a "second thickness." The second thickness of the plurality of active particles is also not discussed in the specification and therefore not defined. However, the second thickness was explicitly discussed and defined during the prosecution history in the Response filed on June 5, 2013 to provide support for an added amendment. (Ex. 1007 at 17.)

In the Response filed on June 5, 2013, Cocona recites that while the second thickness amendment is not explicitly listed in the specification, the amendment is supported based on "the attached Product Data Sheet for the Asbury 5565TM

powdered coconut activated carbon, the particle size for the Asbury 5564TM powdered coconut activated carbon comprises about 10 microns (second thickness)." (*Id*.) Accordingly, the Applicant states that the second thickness is equivalent to the particle size of the active particles utilized in this example. As such, "**second thickness**" means the particle size of the active particles. (Ex. 1005 at ¶¶ 101-103.) Further, this definition is consistent with the disclosure in the '287 Patent concerning the process for making these compositions. (Ex. 1001 at Col. 8:54-66; Ex. 1005 at ¶ 103.)

Claim 27 of the '287 Patent recites an "**order of magnitude**." The order of magnitude is not discussed or defined in the specification. In a 35 U.S.C. § 112 rejection during prosecution, the Examiner proposed a definition for "**order of magnitude**" that was not challenged by the applicant. (Ex. 1008 at 3.) The Examiner stated that "[t]his single data point is insufficient to enable the entire instantly claimed range of the first thickness being less than 10 times larger than the second thickness (i.e. an order of magnitude)." (*Id*.) As such, an "**order of magnitude**" larger means "10 times" larger. (*Id*.; Ex. 1005 at ¶ 104.)

Claim 35 of the '287 Patent recites that the "**composition possesses odor absorbance properties at least in part due to the active particles**." The '287 Patent does not discuss what this claim means. Accordingly, this term should be given its plain meaning in view of the definition of active particles above.

Therefore, this term means that the composition is capable of absorbing, adsorbing or trapping odors at least in part due to the active particles. (Ex. 1005 at ¶ 106.) Further, in its Infringement Claim Chart filed in the Litigation (Case No. 1:16-cv-2703-CMA), the Patent Owner has taken the position that if "active particles" are present in the claimed composition, the claimed composition will, by definition, have "odor absorbance properties at least in part due to the active particles." (Ex. 1026 at p. 4.) Indeed, the Patent Owner sought to map claim 35 to the accused product by arguing that "silicon, oxygen, titanium, calcium, aluminum, and carbon elements are known to possess odor absorbance properties." (*Id.* at p. 4.) As such, this definition includes compositions that utilize particles of silicon, oxygen, titanium, calcium, aluminum, and carbon. (Ex. 1005 at ¶ 106.)

Claim 36 of the '287 Patent recites that the "**composition possesses quick drying properties at least in part due to the active particles**." The phrase "**quick drying properties**" is not discussed or defined in the specification. Accordingly, the phrase should be given its plain meaning in view of the definition of active particles above. Therefore, the term means that the composition is capable of quick drying at least in part due to the active particles. (Ex. 1005 at ¶ 107.) Additionally, in the district court litigation, the Patent Owner argued that when a product has an improved MVTR due to the inclusion of active particles, this product must necessarily possess quick drying properties. (Ex. 1026 at pp. 4-5.) As such, the

above definition encompasses compositions with increased moisture vapor transport capacity due to the inclusion of activated particles. (Ex. 1026 at pp. 4-5; Ex. 1005 at ¶ 107.)

D. Summary Of The Original Prosecution Of The '287 Patent

The '287 Patent was filed on May 9, 2007, as U.S. Application No. 11/801,647 with 72 claims. (Ex. 1010.) Original claim 28, after amendment, matured into issued claim 27 that is the subject of this petition. In the Response filed on June 29, 2011, the Applicant amended claim 28 to recite a "water-proof" composition and a "liquid-impermeable breathable cured" base material (Ex. 1013 at p. 6.) in order to overcome a 35 U.S.C. § 102(b) rejection in the first Final Office Acton (Ex. 1014) over *Haggquist* (Ex. 1004). The Applicant argued:

> Haggquist discloses the use of active particles in a yarn, fiber, foam, and fabric…Haggquist's disclosure of yarns, fibers and like describes the use of active particle in knits and wovens, which operate differently than the current specification's disclosure of membranes.

(Ex. 1013 at p. 12) While the Examiner found the above argument persuasive and withdrew the 35 U.S.C. § 102(b) rejection, the disclosure of *Haggquist* is ***not*** limited to yarn, fiber, foam and fabric as argued by the Patent Owner. (Ex. 1004 at ¶ 35; Ex. 1001 at Col. 3:36-45; Ex. 1005 at ¶ 87.)

The claims were further amended in the Response filed on May 7, 2012 to

recite "a moisture vapor transmission rate of the water-proof composition comprises from about 600g/m^2/day to about 11000g/m^2/day," in order to overcome a 35 U.S.C. § 102(b) rejection over U.S. Pat. No. 6,028,019 to Spijkers ("*Spijkers*")(Ex. 1015) and to overcome a 35 U.S.C. § 103(a) rejection over *Spijkers* (*Id*.) in view of *Haggquist* (Ex. 1004). In response to a Final Office Action mailed on July 16, 2012, the Applicant argued that *Spijkers* did not disclose the recited claims because:

> … larger active particles would not work properly with the small membrane size of Spijkers because the larger active particles would poke holes in the membrane. Such holes would create leaks and diminish the waterproof features of any such membrane.

(*Id*. at 16-17.)

However, the Examiner was not persuaded by the above arguments and recited:

> It is initially noted that Applicants' disclosure is silent as to the specific sizes of the active particles used to manufacture the membrane. Furthermore, there is nothing on the record to show that the particle size disclosed by the Spijkers reference would fail to impart the recited moisture vapor transmission rate on the disclosed membrane, especially since the particle loading rate overlaps to instantly claimed loading rate.

(*Id*. at 3.)

In response to the above rejection, the Applicant amended claim 28 to recite a base material "comprising a first thickness," "the plurality of active particles comprising a second thickness," and that "the first thickness is less than an order of magnitude larger than the second thickness." (Ex. 1007 at 6-7.) In this response, the Applicant stated,

> Support for these claim amendments may be found at, for example, Paragraph 0049, which states that the Example 1 membrane comprises a thickness of about 1 mil, or about 25.4 microns (the first thickness) and Paragraph 0050, which states that the activated carbon used in such a membrane comprises Asbury5564™ powdered coconut activated carbon[.] As seen in the attached Product Data Sheet for Asbury 5564™ powdered coconut activated carbon, the particle size for the Asbury 5564™ powdered coconut activated carbon comprises about 10 microns (the second thickness). Therefore, the first thickness is less than an order of magnitude larger than the second thickness.

(*Id*. at p. 17.)

The Examiner mailed a final rejection on July 3, 2013 in response to the above amendments and rejected claim 28 and its dependent claims under 35 U.S.C. § 112 for indefiniteness and lack of enablement. (Ex. 1008.) The Examiner recited:

> the only dimensions mentioned in the disclosure are at Example 1 in which the first thickness is disclosed as 1 mil (25.4 μm) and the

> second thickness is disclosed as 10 μm. See paragraphs [0049]-[0050] of the specification and the arguments filed 5 June 2013 at page 17, lines 15-22. This single data point is insufficient to enable the entire instantly claimed range of the first thickness being less than 10 times larger than the second thickness (i.e. an order of magnitude).

(*Id*. at p. 3.) Accordingly, the Examiner stated that an order of magnitude larger equates to 10 times larger and stated that the disclosure of single data point is not sufficient disclosure for claiming a range. The Applicant replied to this argument by amending claim 28 to remove the previously added "order of magnitude" limitation and replaced this limitation with a limitation that the first thickness "is at least 2.5 times" larger than the second thickness in the Response filed on October 8, 2013. (Ex. 1019 at 6-7.)

Next, in an October 21, 2013 interview, the Examiner suggested adding the "order of magnitude" limitation back into the claims, which the Applicant accepted as shown in the Interview Summary filed on October 25, 2013. (Ex. 1020). Accordingly, the Examiner amended claim 28 to recite "but less than an order of magnitude larger than the second thickness," and issued a Notice of Allowance on October 25, 2013. (Ex. 1021.)

VI. PETITIONER HAS A REASONABLE LIKELIHOOD OF PREVAILING

Pursuant to 37 C.F.R. § 42.104(b)(4), there is a reasonable likelihood that at

least one claim of the ’287 Patent is unpatentable. Petitioner sets forth below detailed descriptions and claim charts showing how claims 27, 28, 30, 32, 33, and 35-39 of the ’287 Patent are anticipated under pre-AIA 35 U.S.C. § 102(b) and/or are obvious under pre-AIA 35 U.S.C. § 103(a), including identifications of where each claim element is found in the prior art.

A. Each Reference Relied On For Grounds 1-4 Is Prior Art

Each reference applied in Grounds 1-4, which are detailed below, is available as prior art against the ’287 Patent under pre-AIA 35 U.S.C. § 102(b) as set forth above in Section IV.B.2. *Dutta* and *Halley* were not made of record during prosecution of the ’287 Patent. *Haggquist* was of record.

B. A Person Of Ordinary Skill In The Art

A POSITA at the time the ’287 Patent was filed would have had an advanced degree (Master’s or Ph.D.) or a bachelor of science degree in a relevant field combined with practical experience in one of the following: (1) chemical materials, including polymers and materials that undergo sorption; (2) light and its interaction with matter; and (3) waterproof, breathable materials and garments. Four-year college degrees in Chemistry, Chemical Engineering, Polymer Chemistry, or Physics would be appropriate, or, at a minimum, the completion of courses in chemistry, organic chemistry, physical chemistry, polymer science, or proto-physical chemistry.

Petitioner's expert, Abigail Oelker, is a POSITA based on the above definition. (Ex. 1005 at ¶¶ 4-11 and 40; Ex. 1006.)

C. Ground 1: Claims 27, 28, 30, 32, and 36-37 Are Anticipated by *Dutta*

The following claim chart demonstrates that claims 27, 28, 30, 32, and 36-37 are anticipated by *Dutta*. Alternatively, the same claim chart shows that claims 27, 28, 30, 32, and 35-39 are obvious over *Dutta* in view of *Haggquist*. Additional discussion on anticipation and obviousness follows the claim chart.

Claim No.	8,945,287	*Dutta* or *Dutta* in view of *Haggquist*
27	27. A water-proof composition comprising:	***Dutta*** ▪ "The material of the invention can be in the form of a ***waterproof***, air permeable, water vapor permeable non-porous polymer film or sheet made of a polymer resin…" (Ex. 1002 at Abstract (emphasis added).)
	a liquid-impermeable breathable cured base material comprising a first thickness;	***Dutta*** ▪ "A hydrophilic ***polyurethane solution***…was obtained from Soluol Chemical Co. … A film was then cast from this mixture … and ***dried*** under ambient conditions. The dried film ***was then heated*** in an oven at 155°C for 5 minutes to post-cure the film ..." (*Id*. at p. 18:11-21 (emphasis added).) ▪ "The particular technique used to make the polymer film of this invention will depend on the physical form of the polymer resin. In case of ***moisture curing*** prepolymer resins that are liquid under ambient conditions, the absorptive particles can be dispersed into the liquid prepolymer and the resulting liquid dispersion can be converted into a film." (*Id*. at p. 11:9-14 (emphasis added).)

<table>
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<td>▪ Table 1 and Example 1B, show a water-proof composition having a first thickness:

<u>TABLE 1</u>

<u>Polymer Resin:Hydrophilic polyurethane (SOLUCOTE TOP 932)</u>
<u>Physical Form Used:Solution</u>
<u>(about 42% by weight in toluene/dimethylformamide mixture)</u>

<table>
<tr><th>Example</th><th>Absorbent Particle</th><th>Amount of Particle (phr)</th><th>Film Thickness (inches)</th><th>Average WVTR Of Three Test Areas</th><th>Air Permeability</th><th>Waterproofness, (WP2)</th></tr>
<tr><td>Comparative Example 1</td><td>——</td><td>0.0</td><td>0.0027</td><td>5583</td><td>Impermeable</td><td>Pass</td></tr>
<tr><td>Example 1A</td><td>Nalco® 1181</td><td>5.0</td><td>0.0032</td><td>7194</td><td>Impermeable</td><td>Pass</td></tr>
<tr><td>Example 1B</td><td>Sephadex G-200-50</td><td>10.0</td><td>0.0030</td><td>6730</td><td>Impermeable</td><td>Pass</td></tr>
</table>
(Id. at p. 23:3-10.)</td>
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<tr>
<td></td>
<td>a plurality of active particles in contact with the liquid-impermeable breathable cured base material,</td>
<td><u>Dutta</u>
▪ “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 from Sigma Chemical Co., with a particle size of 20-50 micrometers, and an absorption capacity of about 24 gm./gm.) ***was added and stirred to uniformly***</td>
</tr>
</table>

		disperse the particles into the solution." (*Id*. at p. 18:10-21(emphasis added).) ***Haggquist*** "It is well known that certain particles can be used to add performance properties to materials in different forms…These particles can provide such properties because they are "active". Active particles are active because they have the capacity to adsorb or trap substances." (Ex. 1004 at ¶ 3-4.)
	the plurality of active particles comprising a second thickness; and	***Dutta*** ▪ Example 1B referencing Sephadex particles "with a particle size of 20-50 micrometers." (Ex. 1002 at p. 18:11-16.) ▪ "The size of the absorbent-type particles are within a broad range of 0.1 to 300 micrometers when dry. Preferably, the particle size range of the water-swellable particles is 0.1 to 100 micrometers, depending on the film thickness needed for a given application." (*Id*. at p. 9:18-22.) ***Haggquist*** ▪ "The activated carbon used in this example…had a diameter of less than 10 microns." (Ex. 1004 at ¶ 85.)
	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,	***Dutta*** ▪ "The size of the absorbent-type particles are within a broad range of ***0.1 to 300 micrometers*** when dry. Preferably, the particle size range of the water-swellable particles ***is 0.1 to 100 micrometers***, depending on the film thickness needed for a given application." (Ex. 1002 at p. 9:18-22 (emphasis added).) ▪ "Sephadex G-200-50 from Sigma Chemical Co., with a particle size of ***20-50 micrometers***…" (*Id*. at p.

		18:14-16.) ▪ "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 the polymer resin such that at least one surface of the film is substantially smooth by being free of the particles. Therefore, ***the minimum thickness of the polymer film is controlled by the size of the particles. Larger the size of the hydrophilic particles used, higher would be the minimum thickness of the polymer film that will be air impermeable***." (*Id*. at p. 10:37 to p. 11:8.) ▪Example 1B shows the required first thickness (film thickness of 76.2 μm) and second thickness (Sephadex particles sized from 20-50 micrometers): **TABLE 1** **Polymer Resin:Hydrophilic polyurethane (SOLUCOTE TOP 932)** **Physical Form Used:Solution** **(about 42% by weight in toluene/dimethylformamide mixture)** (*Id*. at Table 1.)
	the active particles improve	***Dutta*** ▪ "It has now surprisingly been discovered that ***the***

Example	Absorbent Particle	Amount of Particle (phr)	Film Thickness (inches)	Average WVTR Of Three Test Areas	Air Permeability	Waterproofness, (WP2)
Comparative Example 1	——	0.0	0.0027	5583	Impermeable	Pass
Example 1A	Nalco® 1181	5.0	0.0032	7194	Impermeable	Pass
Example 1B	Sephadex G-200-50	10.0	0.0030	6730	Impermeable	Pass

	the moisture vapor transport capacity of the composition, and	***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).) ▪ See improved WVTR between Comparative Example 1 with no particles and Example 1B with Sephadex particles in Table 1 below: **TABLE 1** **Polymer Resin:Hydrophilic polyurethane (SOLUCOTE TOP 932)** **Physical Form Used:Solution** **(about 42% by weight in toluene/dimethylformamide mixture)** (*Id*. at Table 1.) ***Haggquist*** ▪ "the active particles can bestow performance enhancing characteristics (e.g., odor adsorption, moisture management, etc.) to the embedding substance or material." (Ex. 1004 at ¶ 19.) ▪ "The activated carbon used in this example is sold as model number SA-30…the SA-30 used in this example had a diameter of less than 10 microns." (*Id*. at ¶ 85.)
	a moisture vapor transmission	***Dutta*** ▪ See WVTR of 6730 g/m^2/day for Example 1B in

Example	Absorbent Particle	Amount of Particle (phr)	Film Thickness (inches)	Average WVTR Of Three Test Areas	Air Permeability	Waterproofness, (WP2)
Comparative Example 1	——	0.0	0.0027	5583	Impermeable	Pass
Example 1A	Nalco® 1181	5.0	0.0032	7194	Impermeable	Pass
Example 1B	Sephadex G-200-50	10.0	0.0030	6730	Impermeable	Pass

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<td>rate of the water-proof composition comprises from about 600 g/m2/day to about 11000 g/m2/day.</td>
<td>Table 1 below:

<u>TABLE 1</u>

<u>Polymer Resin:Hydrophilic polyurethane (SOLUCOTE TOP 932)</u>
<u>Physical Form Used:Solution</u>
<u>(about 42% by weight in toluene/dimethylformamide mixture)</u>

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(Ex. 1002 at Table 1.)</td>
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<tr>
<td>28</td>
<td>28. The composition of claim 27, wherein the active particles comprise about 0% to about 75% of the total weight of the composition.</td>
<td>▪ See independent claim 27

<u>Dutta</u>
▪“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 from Sigma Chemical Co...) was added and stirred to uniformly disperse the particles into the solution,” which would result in a particle loading level of 4% by weight. (Id. at p. 18:10-17.)

<u>Haggquist</u>
▪ FIG. 6 discloses that carbon particles are either 1%, 2%, 3%, or 4% of the total weight of the composition and is reproduced below:</td>
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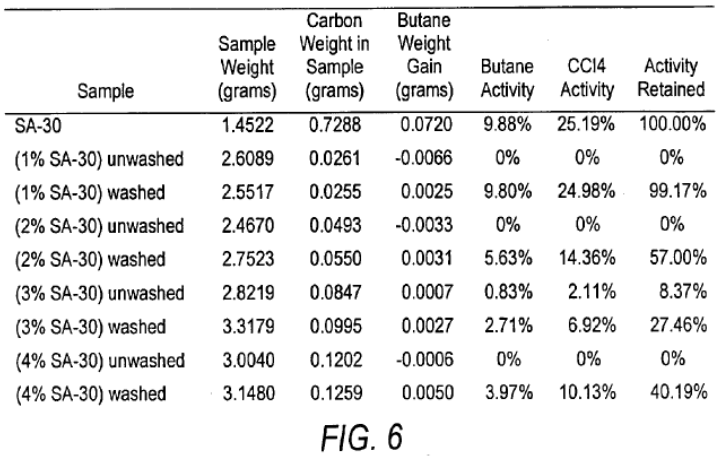
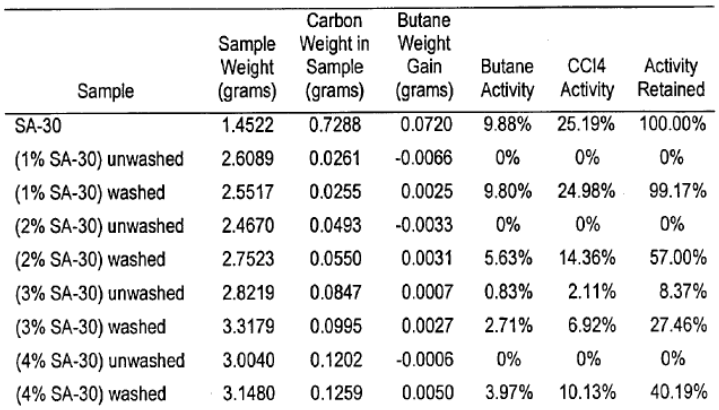
		 FIG. 6 (Ex. 1004 at FIG. 6 and ¶ 91.)
30	30. The composition of claim 27, wherein the active particles comprise about 0% to about 30% of the total weight of the composition.	▪ *See* independent claim 27. ***Dutta*** ▪"To 36.8 grams of the hydrophilic polyurethane solution SOLUCOTE TOP 932, 1.55 grams (10 phr) of cross-linked dextran particles (Sephadex G-200-50 from Sigma Chemical Co...) was added and stirred to uniformly disperse the particles into the solution," which would result in a particle loading level of 4% by weight. (Ex. 1002 at p. 18:10-17.) ***Haggquist*** ▪ FIG. 6 discloses that carbon particles are either 1%, 2%, 3%, or 4% of the total weight of the composition and is reproduced below:

Sample	Sample Weight (grams)	Carbon Weight in Sample (grams)	Butane Weight Gain (grams)	Butane Activity	CCl4 Activity	Activity Retained
SA-30	1.4522	0.7288	0.0720	9.88%	25.19%	100.00%
(1% SA-30) unwashed	2.6089	0.0261	-0.0066	0%	0%	0%
(1% SA-30) washed	2.5517	0.0255	0.0025	9.80%	24.98%	99.17%
(2% SA-30) unwashed	2.4670	0.0493	-0.0033	0%	0%	0%
(2% SA-30) washed	2.7523	0.0550	0.0031	5.63%	14.36%	57.00%
(3% SA-30) unwashed	2.8219	0.0847	0.0007	0.83%	2.11%	8.37%
(3% SA-30) washed	3.3179	0.0995	0.0027	2.71%	6.92%	27.46%
(4% SA-30) unwashed	3.0040	0.1202	-0.0006	0%	0%	0%
(4% SA-30) washed	3.1480	0.1259	0.0050	3.97%	10.13%	40.19%

		 FIG. 6 (Ex. 1004 at FIG. 6 and ¶ 91.)
32	The composition of claim 27, wherein the active particles comprise about 0% to about 50% of the total weight of the composition.	▪ *See* independent claim 27. ***Dutta*** ▪"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 from Sigma Chemical Co...) was added and stirred to uniformly disperse the particles into the solution," which would result in a particle loading level of 4% by weight. (Ex. 1002 at p. 18:10-17.) ***Haggquist*** ▪ FIG. 6 discloses that carbon particles are either 1%, 2%, 3%, or 4% of the total weight of the composition and is reproduced below:

Sample	Sample Weight (grams)	Carbon Weight in Sample (grams)	Butane Weight Gain (grams)	Butane Activity	CCl4 Activity	Activity Retained
SA-30	1.4522	0.7288	0.0720	9.88%	25.19%	100.00%
(1% SA-30) unwashed	2.6089	0.0261	-0.0066	0%	0%	0%
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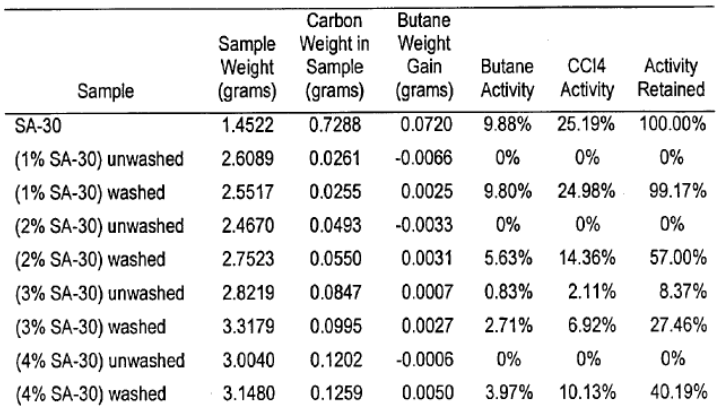
(4% SA-30) unwashed	3.0040	0.1202	-0.0006	0%	0%	0%
(4% SA-30) washed	3.1480	0.1259	0.0050	3.97%	10.13%	40.19%

		 FIG. 6 (Ex. 1004 at FIG. 6 and ¶ 91.)
35	35. The composition of claim 27, wherein the composition possesses odor absorbance properties at least in part due to the active particles.	▪ *See* independent claim 27. ***Dutta*** ▪ Example 1B discloses utilizing "Sephadex particles." (Ex. 1002 at p. 18:10-17.) ▪ "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." (Ex. 1002 at p. 10:4-7.) ***Haggquist*** ▪ "Active particles can provide performance enhancing properties such as odor adsorption, moisture management … and combinations thereof." (Ex. 1004 at ¶ 30.)
36	36. The composition of claim 27, wherein the composition possesses quick drying properties at least in part due to the active	▪ *See* independent claim 27. ***Dutta*** ▪ See improved WVTR between Comparative Example 1 with no particles and Example 1B with Sephadex particles in Table 1 below:

Sample	Sample Weight (grams)	Carbon Weight in Sample (grams)	Butane Weight Gain (grams)	Butane Activity	CCl4 Activity	Activity Retained
SA-30	1.4522	0.7288	0.0720	9.88%	25.19%	100.00%
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(4% SA-30) unwashed	3.0040	0.1202	-0.0006	0%	0%	0%
(4% SA-30) washed	3.1480	0.1259	0.0050	3.97%	10.13%	40.19%

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<u>Polymer Resin:Hydrophilic polyurethane (SOLUCOTE TOP 932)</u>
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(Ex. 1002 at Table 1.)

<u>Haggquist</u>
▪ “Active particles can provide performance enhancing properties such as odor adsorption, moisture management…and combinations thereof.” (Ex. 1004 at ¶ 30.)
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<tr>
<td>37</td>
<td>37. The composition of claim 27, wherein the active particles are selected from the group consisting of: activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking</td>
<td>
▪ See independent claim 27.

<u>Dutta</u>
▪ Example 1B discloses utilizing “Sephadex particles.” (Ex. 1002 at p. 18:10-17.).

<u>Haggquist</u>
▪ “The active particles can include, but are not limited to, activated carbon, graphite, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester Cinnamic acid (cinoxate), zinc oxide, zealites, titanium dioxide, molecular filter type materials, and other suitable materials.” (Ex. 1004 at ¶ 30.)
</td>
</tr>
</table>

	soda, p-methoxy-2-ethoxyethyl ester cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and any suitable combination thereof.	
38	38. The composition of claim 27 further comprising: at least one removable encapsulant in an amount effective to prevent at least a substantial portion of the active particles from being deactivated prior to removal of the removable encapsulant, and wherein the removable encapsulant is removable to reactivate at least a portion of the active particles to	▪ *See* independent claim 27. ***Haggquist*** ▪ "The invention relates to preserving the properties of active particles through use of an encapsulant which may be removable. The encapsulant may protect the active particles against premature deactivation. If desired, the encapsulant may be removed to rejuvenate the active particles. Various processes can be implemented to introduce encapsulated particles to embedding substances which may be used in various products." (*Id*. at Abstract.) ▪ "Active particles can provide performance enhancing properties such as odor adsorption, moisture management…and combinations thereof." (*Id*. at ¶ 30.)

	improve the moisture vapor transport capacity of the composition.	
39	39. The composition of claim 38, wherein the at least one removable encapsulant is selected from the group consisting of: water-soluble surfactants, surfactants, salts, polymer salts, polyvinyl alcohols, waxes, photo-reactive materials, degradable materials, bio-degradable materials, ethoxylated acetylenic diols, starches, lubricants, glycols, corn starch, mineral spirits, organic solvents, paraffinic solvents, and any suitable combination thereof.	▪ *See* independent claim 27 and dependent claim 38. ***Haggquist*** ▪ "The encapsulant can include, but is not limited to, water-soluble surfactants, surfactants, salts (e.g., sodium chloride, calcium chloride), polymer salts, polyvinyl alcohols, waxes (e.g., paraffin, carnauba), photo-reactive materials, degradable materials, biodegradable materials, ethoxylated acetylenic diols, and any other suitable substances." (*Id*. at ¶ 33.)

As shown above, claims 27, 28, 30, 32, and 36-37 of the '287 Patent are

anticipated by *Dutta*. (Ex. 1005 at ¶ 108-137.) The following provides additional analysis showing how select claim elements are disclosed by *Dutta*.

1. *Dutta* Discloses A Liquid-Impermeable Breathable Cured Base Material Comprising a First Thickness

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.

Dutta discloses a cured base material in the creation of the polyurethane film from the drying and heating of a polyurethane solution. (Ex. 1002 at p. 18:11-21 and p. 11:9-14: Ex. 1005 at ¶ 113-115.)

As discussed above, the "**first thickness**" means the thickness of the water-proof composition, which includes the base material and the active particles.

In Table 1, *Dutta* discloses the waterproofness, air permeability, WVTR, and thickness of the different polyurethane films created in Examples 1A and 1B. (Ex. 1002 at p. 23:5-10.) As noted by Table 1 and the descriptions of the Examples in the specification of *Dutta*, the polyurethane films created from drying and heating include the active particles. (*Id*. at p. 17:30-38; p. 18:1-21; and p. 23:5-10.) Therefore, *Dutta* discloses a liquid-impermeable breathable cured base material comprising a first thickness. (Ex. 1002 at p. 23:1-10; p. 18:1-21; and p. 11:9-14; Ex. 1005 at ¶ 113-117.)

2. *Dutta* Discloses A Plurality Of Active Particles In Contact With The Liquid-Impermeable Breathable Cured Base Material

As discussed above, "**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.

Dutta discloses the use of active particles (absorbent particles) in contact with or layered on a liquid-impermeable breathable cured base material (incorporating the particles into the polymeric film). (Ex. 1002 at p. 4:20-28.)

Dutta also uses Sephadex particles in Example 1B. (*Id*. at p. 18:10-21.) As such, *Dutta* discloses a plurality of active particles, since *Dutta* uses Sephadex particles (Ex. 1002 at & p. 18:10-21; Ex. 1005 at ¶ 117-125.), which are molecular filter (Ex. 1024 at Col. 1:66-68.), porous (Ex. 1023 at p. 1286.), adsorbent (*Id*. at p. 143.) and absorbent (Ex. 1002 at p. 4:20-28; & p. 18:10-21.) particles that are capable of trapping water and other substances. (Ex. 1023 at p. 143; Ex. 1002 at p. 18:10-21 and p. 23:3-10; Ex. 1005 at ¶ 117-125.)

3. *Dutta* Discloses The Plurality Of Active Particles Comprising A Second Thickness

As discussed above, a "second thickness" means the particle size of the 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

micrometers, 0.1 to 100 micrometers, or 20-50 micrometers). (Ex. 1002 at p. 9:15-22, p. 18:14-16; Ex. 1005 at ¶ 127-129.)

4. *Dutta* Discloses That 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

As discussed above, "order of magnitude" means 10 times larger. This claimed thickness ratio is shown in Example 1B and Table 1 in *Dutta*. (*Id.* at p. 18:11-21 and Table 1.) As discussed above, the first thickness, based on the thickness of the film in Example 1B, is 0.0030 inches (76.2 microns) and the second thickness, based on the Sephadex particle size, is from 20-50 microns. As such, any particles sized from 20-30 microns within the 20-50 micron range meet the claimed thickness ratio. For example, 76.2 microns is more than 2.5 times 20-30 μm (50-75 μm) and less than 10 times larger than 20-30 μm (200-300 μm).

Additionally, *Dutta* discloses that the sizing between the particles and film thickness plays an important role in obtaining an effective composition. (Ex. 1002 at p. 10:37 to p. 11:8.) As such, *Dutta* discloses similar reasons why sizing between the active particles and the base layer is important as asserted by the Patent Owner during the prosecution history. (*Id*. at p. 10:37 to p. 11:8.) *Dutta* recites that the particles cannot pierce through both surfaces of the polymer film. (*Id*.) Similarly, during the prosecution history, the Patent Owner recited:

> Also, larger active particles would not work properly with the small membrane size of Spijkers because the ***larger active particles would poke holes in the membrane***. Such holes would create leaks and diminish the waterproof features of any such membrane.

(Ex. 1017 at 16-17 (emphasis added).) As such, *Dutta* discloses the above limitation. (Ex. 1005 at ¶ 129-130.)

5. *Dutta* Discloses A MVTR Of The Water-Proof Composition Comprises From About 600 g/m^2/day To About 11000 g/m^2/day

The WVTR disclosed in Example 1B in Dutta is 6730 g/m^2/day. (Ex. 1002 at p. 23:3-10.) The WVTR disclosed in Dutta is also known as a MVTR, which is expressed in grams of water per square meter of material per day ("g/m²/day" or "g/m²/24 hours"). (Ex. 1002 at p. 18:10-21 & p. 23:3-10; Ex. 1001 at Col 8:61 to Col. 9:13; Ex. 1005 at ¶ 57). As such, Dutta discloses the above limitation. (Ex. 1002 at p. 23:5-10; Ex. 1005 at ¶ 131-132.)

6. *Dutta* Discloses A Composition That Possesses Quick Drying Properties At Least In Part Due To The Active Particles

As discussed above, this limitation means that the composition is capable of quick drying at least in part due to the active particles. Additionally, based on the Patent Owner's arguments in district court, the above definition encompasses compositions with increased moisture vapor transport capacity due to the inclusion of activated particles. (Ex. 1026 at pp. 4-5.)

Dutta uses Sephadex particles, which are active particles that increase the WVTR of a composition. (Ex. 1002 at p. 23:3-10; Ex. 1005 at ¶ 118-126.) As such, *Dutta* discloses the quick drying limitation. (Ex. 1002 at p. 23:3-10; Ex. 1005 at ¶ 136.)

7. *Dutta* Discloses That The Active Particles Are Selected From The Group Consisting Of: … Molecular Filter-Type Materials….

As discussed above, Dutta uses Sephadex particles, which are a molecular filter-type material. (Ex. 1024 at Col. 1:66-68; Ex. 1002 at 23:3-10.) As such, Dutta discloses the above limitation. (Ex. 1024 at Col. 1:66-68; Ex. 1002 at 23:3-10; Ex. 1005 at ¶ 137.)

D. Ground 2: Claims 27, 28, 30, 32, and 35-39 Are Obvious Over *Dutta* In View Of *Haggquist*

The claim chart in Section VI.C shows the disclosure of each limitation of claims 27, 28, 30, 32, and 35-39 in *Dutta* in view of *Haggquist*.

Further, a POSITA before May 9, 2006 would have had multiple reasons to combine *Dutta* and *Haggquist* with a reasonable expectation of successfully 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 following is additional analysis demonstrating that the claims at issue are obvious

over *Dutta* in view of *Haggquist*. Petitioner incorporates its discussion of the limitations of the ’287 Patent from Section VI.C above.

1. *Dutta* in view of *Haggquist* Discloses A Plurality Of Active Particles In Contact With The Liquid-Impermeable Breathable Cured Base Material

As discussed above, “**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.

If Cocona argues that that the Sephadex particles disclosed in *Dutta* are not active particles, *Haggquist* discloses active particles that can be substituted for the Sephadex particles utilized in Example 1B. (Ex. 1004 at ¶ 30.)

Haggquist has the same inventor as the ’287 Patent. (Ex. 1004.) As such, several portions of the disclosure of *Haggquist* are identical to or very similar to portions listed in the ’287 Patent. (*See generally* Ex. 1004; & Ex. 1001.) Further, as discussed above, the ’287 Patent incorporates *Haggquist* by reference. (Ex. 1001 at Col. 6:65-61.) As such, any description of active particles in *Haggquist* has to meet the definition of active particles in the ’287 Patent. The background of *Haggquist* recites that “[i]t is well known that certain particles can be used to add performance properties to materials in different forms…These particles can provide such properties because they are ‘active’. Active particles are active

because they have the capacity to adsorb or trap substances." (Ex. 1004 at ¶ 3-4.)

Haggquist further recites:

> The active particles can include, but are not limited to, activated carbon, graphite, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester Cinnamic acid (cinoxate), zinc oxide, zealites, titanium dioxide, molecular filter-type materials, and other suitable materials."

(*Id*. at ¶ 30.) Accordingly, *Dutta* in view of *Haggquist* discloses the above limitation.

2. *Dutta in View of Haggquist* Discloses The Plurality Of Active Particles Comprising A Second Thickness

As discussed above, a "**second thickness**" means the particle size of the active particle. *Haggquist* recites a plurality of active particles (Carbon) with a second thickness (diameter of less than 10 microns). (*Id*. at ¶ 85.). Accordingly, *Dutta* in view of *Haggquist* discloses the above limitation.

3. *Dutta* in view of *Haggquist* Discloses That 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

As discussed above, "**order of magnitude**" means 10 times larger. *Dutta* discloses, in Table 1 for Example 1B, a first thickness of 0.0030 inches, which converts into 76.2 μm. As also discussed above, *Haggquist* discloses a second thickness of less than 10 microns for Example 1. (*Id*. at ¶ 85.)

Particles sized from 8-9 microns, which is within the less than 10 microns range of *Haggquist,* meets the claimed thickness ratio. For example, 76.2 microns is more than 2.5 times 8-9 microns (20-22.5 microns) and less than 10 times larger than 8-9 microns (80-90 microns).

Additionally, as discussed above, *Dutta* discloses that the sizing between the particles and film thickness plays an important role in obtaining an effective composition. (Ex. 1002 at p. 10:37 to p. 11:8.) As such, not only does *Dutta* in view of *Haggquist* disclose a composition having the claimed size ratio, but *Dutta* also discloses similar reasons why sizing between the active particles and the base layer is important as asserted by the Patent Owner during the prosecution history. (Ex. 1002 at p. 10:37 to p. 11:8; Ex. 1017 at 16-17.) As such, *Dutta* in view of *Haggquist* discloses the above limitation.

4. *Dutta in view of Haggquist* Discloses The Active Particles Improve The Moisture Vapor Transport Capacity Of The Composition

Table 1 of *Dutta* discloses an improved moisture vapor transport capacity due to the inclusion of particles that trap water (Ex. 1002 at p. 4:20-28 and Table 1.)

Haggquist discloses active particles that trap water and have moisture management properties. (Ex. 1004 at ¶ 30.) Further, *Haggquist* is incorporated by reference into the ’287 Patent and provides an identical list of active particles, (also

graphite). (*Id*.) As such, a POSITA would understand that the active particles listed in *Haggquist* would improve a MVTR.

For instance, Example 1 of the ’287 Patent shows that adding activated carbon to cured polyurethane solution improves the MVTR. (Ex. 1001 at Col. 8:51 to Col. 9:46.) If the activated carbon disclosed in *Haggquist* replaces the Sephadex particles in the cured polyurethane solution in Example 1B of *Dutta*, there is a reasonable expectation of success that the composition would provide an improved moisture vapor transport capacity. As such, *Dutta* in view of *Haggquist* discloses the above limitation. (Ex. 1005 at ¶¶ 171-172.)

5. *Dutta* in view of *Haggquist* Discloses A Moisture Vapor Transmission Rate Of The Water-Proof Composition Comprises From About 600 g/m^2/day To About 11000 g/m^2/day

Example 1B of *Dutta* discloses a composition with a MVTR of 6730 g/m^2/day due to the inclusion of Sephadex particles that trap water (Ex. 1002 at p. 4:20-28, p. 17:24-27 and Table 1 at Example 1B.)

Petitioner incorporates its discussion of this limitation of the ’287 Patent from Section VI.D.6. If the activated carbon from Haggquist replaces the Sephadex particles in the cured polyurethane solution in Example 1B of Dutta, there is a reasonable expectation of success that the composition would have a MVTR within the claimed range. For example, FIG. 2 of the ’287 Patent shows that carbon

particles combined with polyurethane have MVTRs that range from 6,356 g/m^2/day to 10,385 g/m^2/day. (Ex. 1001 at FIG. 2.) As such, Dutta in view of Haggquist discloses the above limitation. (Ex. 1005 at ¶¶ 171-172.)

6. *Dutta* In View Of *Haggquist* Discloses A Composition That Possesses Quick Drying Properties At Least In Part Due To The Active Particles

As discussed above, this limitation means that the composition is capable of quick drying at least in part due to the active particles. Additionally, based on the Patent Owner's arguments in district court, the above definition encompasses compositions with increased moisture vapor transport capacity due to the inclusion of activated particles. (Ex. 1026 at pp. 4-5.)

Petitioner incorporates its discussion of this limitation of the '287 Patent from Section VI.D.7. As such, *Dutta* in view of *Haggquist* discloses the above limitation.

7. Reasons to Combine and Reasonable Expectation of Success in Combining *Dutta* And *Haggquist* to Arrive at Claims 27, 28, 30, 32, and 35-39.

Reason to Combine the References: Prior to May 9, 2006, a POSITA interested in enhancing the performance capabilities of a membrane would have had several reasons to combine the teachings of *Dutta* and *Haggquist* to substitute the Sephadex particles disclosed in Example 1B of *Dutta* with the admittedly active particles disclosed in *Haggquist*. (Ex. 1002 at Abstract; and Ex. 1004 at ¶ 3

and 30; Ex. 1005 at ¶ 145-158, 180-183.)

Indeed, (1) both references teach adding particles to a substrate to add performance enhancing characteristics, such as moisture management, to garments, such as clothing; (2) both references use porous particles with the ability trap water to add performance enhancing characteristics to garments. (Ex. 1023 at p. 143, and 1286; Ex. 1002 at p. 4:20-28, p. 18:10-17, p. 23:1-10; Ex. 1004 at ¶ 4-5.); (3) a POSITA would also be motivated to combine *Dutta* and *Haggquist* because as shown in *Dutta*, hydrophilic Sephadex particles are utilized interchangeably with other similar type particles, such as Nalco 1181 (Ex. 1002 at pp. 17-18 and 23); (4) *Haggquist* discloses that "molecular filter-type materials" are suitable activated particles and the Sephadex particles in *Dutta* are molecular filter-type materials (Ex. 1002 at p. 18 and 23; Ex. 1024 at Col. 1:66-68; and Ex. 1004 at ¶ 30.); and (5) *Haggquist* discloses systems and methods (removable encapsulants) for protecting the performance enhancing characteristics of active particles, including moisture management (Ex. 1002 at Abstract; and Ex. 1004 at ¶ 3.).

Dutta and *Haggquist* are analogous art. Both *Dutta* and *Haggquist* add particles to a substrate to provide performance enhancing characteristics to the substrate. (*Id*.) For example, *Dutta* recites that "[t]he water vapor transmission rate (WVTR) of a nonporous polymeric film can be increased by incorporating into it hydrophilic absorbent particles." (Ex. 1002 at Abstract.) *Haggquist* discloses that

"[i]t is well known that certain particles can be used to add performance properties to materials," such as moisture management. (Ex. 1004 at ¶ 3.)

Both *Dutta* and *Haggquist* disclose that these added performance properties can be utilized to improve clothing and other outdoor protective gear. (Ex. 1002 at p. 14:32 to p. 15:4; Ex. 1004 at ¶ 81.) *Dutta* recites that "[t]hese functional properties make these products particularly useful as materials for articles of protective clothing providing comfort as well as protection from influences such as outdoor weather." (Ex. 1002 at p. 14:32 to p. 15:4.) *Haggquist* recites: "The treated materials can also be used in clothing ... In addition, hunting gear can be made using the treated materials of the present invention." (Ex. 1004 at ¶ 81.)

Furthermore, the particles in *Dutta* and *Haggquist* perform the same function. *Haggquist* discloses that its active particles, such as activated carbon particles, are porous particles that chemically and/or physically react with and/or trap water in their pores to provide moisture management properties. (*Id*. at ¶ 30.) *Dutta* discloses utilizing hydrophilic water absorbing Sephadex particles with a strong affinity for water to improve the WVTR of a substrate. (Ex. 1002 at Abstract; p. 18:10-21; Table 1.) And as known by a POSITA, Sephadex traps water in its pores as do activated particles. Further, porous Sephadex particles are adsorptive particles that behave as molecular filters and can trap water. (*Id.* at Abstract, p. 23:3-10.; Ex. 1023 at p. 143 and 1286; and Ex. 1024 at Col. 1:66-68.)

Thus, whether acting through an adsorptive mechanism of action, or an absorptive mechanism of action, the porous, hydrophilic Sephadex particles physically react with and/or trap water (Ex. 1002 at Abstract, p. 23:3-10.; Ex. 1023 at p. 143 and 1286; Ex. 1024 Col. 1:66-68.), which is the same function performed by the porous, activated particles disclosed in *Haggquist*. (Ex. 1004 at ¶ 3 and 30.) As such, both *Dutta* and *Haggquist* disclose use of particles that both perform the function of trapping water in their pores to improve moisture management. It would be obvious to a POSITA to substitute the porous water-trapping particles of *Haggquist* for the porous water-trapping particles of Sephadex in *Dutta*.

The Sephadex particles are provided as an example in *Dutta* of possible particles that would work. *Dutta* provides other examples, like the Nalco 1181 particles. (Ex. 1002 at p. 17-18, Table 1.) As such, it would be obvious to a POSITA to try other similar particles to achieve similar results.

Both *Dutta* and *Haggquist* disclose the use of molecular filter-type materials to add moisture management. The Sephadex particles utilized in Example 1B of *Dutta* are known molecular filter particles. (Ex. 1024 at Col. 1:66-68.) *Haggquist* discloses the use of molecular filter-type materials, such as silica gel particles. (Ex. 1004 at ¶ 30; Ex. 1023 at pp. 1286.) As such, a POSITA would be motivated to try other molecular filter-type materials or other porous particles that can trap water to achieve the same or maybe even better results, such as the silica gel particles

disclosed in *Haggquist*.

Additionally, as known by a POSITA, Sephadex particles were used interchangeably in the prior art with other admittedly active particles in other industries. (Ex. 1023 at pp. 1286.). Specifically, gel filtration uses ***polydextran*** gel high cross-linked polymer, ***silica gel or other porous*** particles. (*Id*. at pp. 983 and 1286 (emphasis added).) Both the '287 Patent and *Haggquist* disclose silica gel particles as active particles. (Ex. 1001 at Col. 4:22-23; Ex. 1004 at ¶ 30.) As such, for gel filtration, Sephadex particles, also known as dextran particles are utilized interchangeably with silica gel particles. (Ex. 1023 at pp. 983, 989, and 1286.) Accordingly, a POSITA before May 9, 2006 would know that the Sephadex particles disclosed in *Dutta* could be replaced with other types of molecular filter materials, including admittedly active particles such as the silica gel particles disclosed in *Haggquist*.

A POSITA would have been further motivated to utilize the removable encapsulants systems from *Haggquist* with the particles in *Dutta,* because *Haggquist* discloses that the encapsulant protects the performance enhancing characteristics of active particles from premature deactivation. (Ex. 1004 at Abstract, ¶ 13.) A POSITA would want to protect the performance enhancing characteristics of active particles with known methods. As such, a POSITA before May 9, 2006 would have been motivated to combine *Dutta* with *Haggquist* to

provide performance enhanced materials with activated particles that could be protected from premature deactivation.

Since Sephadex particles are known adsorptive and molecular filter-type materials (Ex. 1023 at 143; Ex. 1024 at Col. 1:66-68.), a POSITA would be motivated to use the encapsulant method disclosed in *Haggquist* with the adsorptive, molecular filter-type materials of Sephadex particles utilized in Example 1B of *Dutta* to protect the performance characteristics of the Sephadex particles from premature deactivation. As such, a POSITA before May 9, 2006 would have been motivated to combine *Dutta* with *Haggquist* to provide clothing with performance enhancing characteristics from active particles that were protected from premature deactivation. (Ex. 1005 at ¶¶ 145-158, 180-183.)

Therefore, one of ordinary skill in the art would have had multiple reasons to combine the teachings of *Dutta* and *Haggquist* to provide compositions with performance enhanced characteristics.

Reasonable Expectation of Success: One of ordinary skill in the art before May 9, 2006 would have reasonably expected the substitution of the active particles discloses in *Haggquist* with the Sephadex particles disclosed in *Dutta* to work and that the encapsulation benefits of *Haggquist* to apply to and work with the particles utilized in *Dutta* since both references disclose the use of porous particles that trap and/or adsorb water. (Ex. 1004 at Abstract, ¶ 3, 4, and 30; Ex.

1002 at p. 23:3-10; Ex. 1023 at pp. 143, 1286; & Ex. 1005 at ¶¶ 155-157 & 181-182.)

Both *Dutta* and *Haggquist* disclose performance enhancement due to the addition of particles that interact with and trap water. *Haggquist* discloses that its active particles, such as activated carbon particles, are porous particles that chemically and/or physically react with and/or trap water in their pores to provide moisture management properties. (Ex. 1004 at ¶ 3-4, 30.) *Dutta* discloses utilizing water absorbent particles that trap water to improve the WVTR of a substrate. (Ex. 1002 at Abstract.) Further, *Dutta* discloses the use of Sephadex particles, which are known porous, molecular filter, and adsorptive particles, that trap water. (*Id.* at Abstract, p. 23:3-10.; Ex. 1023 at p. 143, 1286; and Ex. 1024 at Col. 1:66-68.) Thus, whether acting through an adsorptive mechanism of action, or an absorptive mechanism of action, the porous Sephadex particles physically react with and/or trap water (*Id*.), which is the same function performed by the porous, activated particles disclosed in *Haggquist*. (Ex. 1004 at ¶ 3-4, 30.) As such, both *Dutta* and *Haggquist* disclose use of the same types of particles to provide similar performance enhancing characteristics to a garment. A POSITA would therefore reasonably expect the active particles listed in *Haggquist* to be successful when they are substituted for the Sephadex particles utilized in Example 1B of *Dutta*. (Ex. 1005 at ¶¶ 155-157.)

When a patent "simply arranges old elements," i.e., substituting the active particles from *Haggquist* with the Sephadex particles in *Dutta*, "with each [element] performing the same function it had been known to perform," i.e., trapping water, "and yields no more than one would expect from such an arrangement," i.e., improve the WVTR, "the combination is obvious." *KSR Int'l Co. v. Teleflex, Inc., 550 U.S. 398, 417 (2007)*.

A POSITA before May 9, 2006 understood the importance of protecting active particles from premature deactivation. (Ex. 1004 at Abstract.) A POSITA would have a reasonable expectation that the combination of the encapsulant method disclosed in *Haggquist* with the Sephadex particles utilized in *Dutta* would succeed because *Haggquist* recites that this encapsulant method works on active particles (which include adsorbent, absorbent, and molecular filter particles). (*Id*. at Abstract and ¶ 30.) Since both *Dutta* and *Haggquist* disclose the use of the active particles with similar properties (molecular filter-type materials that are porous, adsorptive, and/or absorptive particles that trap water), there is a reasonable expectation that use of a removable encapsulant from *Haggquist* would succeed to improve the performance characteristics of the active particles disclosed in *Dutta* and/or in *Haggquist*. (Ex. 1002 at p. 23:3-10; Ex. 1004 at Abstract and ¶ 30.)

When a patent "simply arranges old elements," i.e., adding an encapsulant to Sephadex or activated carbon, "with each [element] performing the same function

it had been known to perform," i.e., capable of protecting Sephadex or activated carbon from premature deactivation, "and yields no more than one would expect from such an arrangement," i.e., the reactivation of Sephadex or activated carbon particles to improve the WVTR, "the combination is obvious." *KSR*, 550 U.S. at 417.

E. Ground 3: Claims 27, 28, 30, 32, 33, and 35-37 Are Anticipated by *Halley*

The following claim chart demonstrates that claims 27, 28, 30, 32, 33, and 35-37 are anticipated by *Halley*. Additional discussion on anticipation follows the claim chart.

Claim No.	8,945,287	*Halley*
1	1. A water-proof composition comprising:	***Halley*** ▪ "The present invention relates to a composite material, especially a water-resistant water-vapour-permeable material which has improved abrasion resistance and other desirable properties." (Ex. 1003 at p. 1:8-10.) ▪ "By 'liquid water resistant' is meant that the material is ***waterproof*** at a water pressure of 13.8 kN/M2." (*Id*. at p. 6:27-28 (emphasis added).)
	a liquid-impermeable breathable cured base material comprising a first thickness;	***Halley*** ▪ "The present invention is directed to a composite material which comprises a substrate and a continuous polymer coating applied to the substrate." (*Id*. at Abstract.) ▪ "The polymer applied as a continuous coating to the

		substrate is generally a water-vapour-permeable hydrophilic polymeric material which allows the passage of water vapour therethrough ***without being permeable to liquid water***." (*Id*. at p. 2:24-27 (emphasis added).) ▪ "Suitable polymers include hydrophilic ***polyurethanes***, polyesters, polyethers… Particularly preferred polyurethanes are disclosed in US patents 4,194,041 and 4,532,316." (*Id*. at p. 2:27-33 (emphasis added).) ▪ "Generally, the coating has a thickness of 5 to 100 microns." (*Id*. at p. 2:34.) ▪ "In a still further preferred embodiment of the present invention, a discontinuous pattern of abrasion-resisting polymeric material may be provided on the coating, … may be any suitable pattern, such as a pattern of dots or lines, …Each dot generally has a height in the range 10-200 microns, preferably 70-140 microns and particularly 80-100 microns." (*Id*. at p. 5:5-22.)
	a plurality of active particles in contact with the liquid-impermeable breathable cured base material,	***Halley*** ▪ "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." (*Id*. at p. 3:1-7.)
	the plurality of active particles comprising a second thickness;	***Halley*** ▪ "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

<table>
<tr><td></td><td>and</td><td>generally less than 50,000 nm, particularly less than 5,000nm, especially less than 500nm, more especially less than 200nm and most especially less than 50nm. The primary particle size is the particle size of the smallest discreet particle, it being understood that primary particles may cluster together to form aggregates (typically 1 to 100, 1 to 20 or 1 to 5 microns median particle size).” (Id. at p. 3:8-20.)</td></tr>
<tr><td></td><td>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,</td><td><u>Halley</u>
▪ “Generally, the coating has a thickness of 5 to 100 microns.” (Id. at p. 2:34.)

▪ “The primary particle size is generally less than 50,000 nm, particularly less than 5,000nm, especially less than 500nm, more especially less than 200nm and most especially less than 50nm.” (Id. at p. 3:8-13.)</td></tr>
<tr><td></td><td>the active particles improve the moisture vapor transport capacity of the composition, and</td><td><u>Halley</u>
▪ See improved MVTR between Control with zero particles and Samples 1-3 with added carbon particles in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>

<table><tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr><tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>0.3</td><td>7736</td><td>504-864</td><td>140,000 (23094)</td><td>47.9 (1.25)</td></tr><tr><td>2</td><td>0.65</td><td>7736</td><td>672-864</td><td>120,000 (23094)</td><td>45.0 (1.18)</td></tr><tr><td>3</td><td>1.5</td><td>6924</td><td>504-672</td><td>110,000 (47610)</td><td>42.3 (2.32)</td></tr></table>
(Id. at p. 9:1-5.)</td></tr>
</table>

<table>
<tr>
<td></td>
<td>a moisture vapor transmission rate of the water-proof composition comprises from about 600 g/m2/day to about 11000 g/m2/day.</td>
<td><u>Halley</u>
▪ See WVTR of 7736 g/m2/day, 7736 g/m2/day, and 6924 g/m2/day for Samples 1 in 3 in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>
<table><tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr><tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>0.3</td><td>7736</td><td>504-864</td><td>140,000 (23094)</td><td>47.9 (1.25)</td></tr><tr><td>2</td><td>0.65</td><td>7736</td><td>672-864</td><td>120,000 (23094)</td><td>45.0 (1.18)</td></tr><tr><td>3</td><td>1.5</td><td>6924</td><td>504-672</td><td>110,000 (47610)</td><td>42.3 (2.32)</td></tr></table>(Id.)</td>
</tr>
<tr>
<td>28</td>
<td>28. The composition of claim 27, wherein the active particles comprise about 0% to about 75% of the total weight of the composition.</td>
<td>▪ See independent claim 27.

<u>Halley</u>
▪ Halley discloses utilizing 0.3%, 0.65 %, and 1.5 % carbon particles relative to the total weight of the composition in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>
<table><tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr><tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1</td><td>0.3</td><td>7736</td><td>504-864</td><td>140,000 (23094)</td><td>47.9 (1.25)</td></tr><tr><td>2</td><td>0.65</td><td>7736</td><td>672-864</td><td>120,000 (23094)</td><td>45.0 (1.18)</td></tr><tr><td>3</td><td>1.5</td><td>6924</td><td>504-672</td><td>110,000 (47610)</td><td>42.3 (2.32)</td></tr></table>(Id.)</td>
</tr>
<tr>
<td>30</td>
<td>30. The composition of claim 27, wherein the active particles</td>
<td>▪ See independent claim 27.

<u>Halley</u>
▪ Halley discloses utilizing 0.3%, 0.65 %, and 1.5 %</td>
</tr>
</table>

<table>
<tr>
<td></td>
<td>comprise about 0% to about 30% of the total weight of the composition.</td>
<td>carbon particles relative to the total weight of the composition in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>

<table>
<tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr>
<tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1</td><td>0.3</td><td>7736</td><td>504-864</td><td>140,000 (23094)</td><td>47.9 (1.25)</td></tr>
<tr><td>2</td><td>0.65</td><td>7736</td><td>672-864</td><td>120,000 (23094)</td><td>45.0 (1.18)</td></tr>
<tr><td>3</td><td>1.5</td><td>6924</td><td>504-672</td><td>110,000 (47610)</td><td>42.3 (2.32)</td></tr>
</table>
(Id.)</td>
</tr>
<tr>
<td>32</td>
<td>32. The composition of claim 27, wherein the active particles comprise about 0% to about 50% of the total weight of the composition.</td>
<td>▪ See independent claim 27.

<u>Halley</u>
▪ Halley discloses utilizing 0.3%, 0.65 %, and 1.5 % carbon particles relative to the total weight of the composition in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>

<table>
<tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr>
<tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
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</table>
(Id.)</td>
</tr>
<tr>
<td>33</td>
<td>33. The composition of claim 27, wherein the composition possesses anti-static properties at</td>
<td>▪ See independent claim 27.

<u>Halley</u>
▪ “When the particulate solid is carbon, it is found that the material exhibits electrical conductivity at surprisingly low carbon contents (around 1% by</td>
</tr>
</table>

<table>
<tr><td></td><td>least in part due to the active particles.</td><td>weight). This is valuable in providing a material having antistatic properties." (Id. at p. 3:31-34.)

▪"the carbon-loaded material will be useful where electrical conductivity and antistatic properties are desirable." (Id. at p. 5:27-29.)</td></tr>
<tr><td>35</td><td>35. The composition of claim 27, wherein the composition possesses odor absorbance properties at least in part due to the active particles.</td><td>▪ See independent claim 27.

<u>Halley</u>
▪ "A preferred particulate solid is carbon particles… Further particulate solids include particles of titanium dioxide, zinc oxide, iron oxide, aluminum oxide, silica, talc, mica, tin or silver." (Id. at p. 3:1-7.)</td></tr>
<tr><td>36</td><td>36. The composition of claim 27, wherein the composition possesses quick drying properties at least in part due to the active particles.</td><td>▪ See independent claim 27.

<u>Halley</u>
▪ "A preferred particulate solid is carbon particles… Further particulate solids include particles of titanium dioxide, zinc oxide, iron oxide, aluminum oxide, silica, talc, mica, tin or silver." (Id. at p. 3:1-7.)

▪ See improved MVTR between Control with zero particles and Samples 1-3 with added carbon particles in Table 3 below:
<u>TABLE 3 (fabric & membrane & dots)</u>

<table>
<tr><th>Sample</th><th>Particle % wt</th><th>MVTR (mean) g/m²/d</th><th>Wash to leak hr</th><th>Abrasion to leak cycles</th><th>Handle (mean)</th></tr>
<tr><td>Control</td><td>-</td><td>6344</td><td>504-672</td><td>87500 (1500)</td><td>46.8 (2.69)</td></tr>
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</table>
</td></tr>
</table>

		(*Id*. at p. 9:1-5.)
37	37. The composition of claim 27, wherein the active particles are selected from the group consisting of: activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and any suitable combination thereof.	▪ *See* independent claim 27. ***Halley*** ▪ "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." (*Id*. at p. 3:1-7.)

As shown in the above claim chart, claims 27, 28, 30, 32, 33, and 35-37 are anticipated by *Halley*. The following is additional analysis demonstrating how select claim elements are disclosed by *Halley*.

1. *Halley* Discloses A Liquid-Impermeable Breathable Cured Base Material Comprising a First Thickness

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.

Halley discloses a liquid-impermeable breathable cured based material because it uses a water-vapour-permeable hydrophilic polymer material, such as a cured polyurethane solution. (Ex. 1003 at p. 2:24-33, p. 7:6-8, p. 8:7-31; Ex. 1005 at ¶ 194-198.)

As discussed above, the "first thickness" means the thickness of the water-proof composition, which includes the base material and the active particles.

Therefore, *Halley* discloses a liquid-impermeable breathable cured base material (cured polyurethane solution) (including particulates) comprising a first thickness (polymeric material of 5-100 microns, 10-200 microns, 70-140 microns, and 80-100 microns). (Ex. 1003 at p. 2:24-33, p. 5:5-22; and Ex. 1025 at Col. 8:5-16; Ex. 1005 at 194-201.)

2. *Halley* Discloses The Plurality Of Active Particles Comprising A Second Thickness

As discussed above, a "second thickness" means the particle size of the active particle. *Halley* discloses a plurality of active particles (particulates) have a second thickness (50 µm, 5 µm, 0.5 µm, 0.2 µm, 0.05 µm, 1 to 100 µm, 1 to 20 µm, or 1 to 5 µm particle sizes). (Ex. 1003 at p. 3:8-20; Ex. 1005 at 202-206.)

3. *Halley* Discloses That 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

As discussed above, "order of magnitude" means 10 times larger. *Halley* discloses the following first thickness ranges: 5-100 microns; 10-200 microns; 70-140 microns; and 80-100 microns. (Ex. 1003 at p. 5:5-22.) *Halley* discloses the following second thicknesses and second thickness ranges: 50 μm; 5 μm; 0.5 μm; 0.2 μm; 0.05 μm; 1 to 100 μm; 1 to 20 μm; or 1 to 5 μm. (*Id*. at p. 3:8-20.)

Given the range of particle sizes and polymeric material thickness ranges, several different particle size and polymeric material thicknesses are provided that meet claimed size relationships between two thicknesses. For example, a polymeric film thickness of 70-140 microns or 80-100 microns, which are two of the four disclosed ranges in *Halley*, meet the claimed thickness relationship of being 2.5 times greater than a particle size of 20 μm (50 μm) but less than an order of magnitude greater than the particle size of 20 μm (200 μm). The particle size of 20 μm falls within two of the three different particle size ranges disclosed in *Halley.*

As such, *Halley* discloses the above limitation. (Ex. 1005 at ¶ 207-210.)

4. *Halley* Discloses The Composition possesses Odor Absorbance Properties At Least In Part Due To Active Particles

As discussed above, "odor adsorption" means capable of absorbing, adsorbing or trapping odors at least in part due to the active particles. This definition includes a composition including particles of activated carbon, aluminum oxide, silica gel, and titanium dioxide. (Ex. 1001 at Col. 4:22-27; Ex. 1004 at ¶¶ 3, 19, 30, 80, and 84; Ex. 1026 at p. 4.)

Halley recites "[a] ***preferred particulate solid is carbon particles***…Further particulate solids include ***particles of titanium dioxide***, ***zinc oxide***, iron oxide, ***aluminum oxide***, ***silica***, talc, mica, tin or silver." (Ex. 1003 at p. 3:1-7 (emphasis added).) As such, *Halley* discloses the above limitation. (Ex. 1005 at ¶ 216.)

5. *Halley* Discloses A Composition That Possesses Quick Drying Properties At Least In Part Due To The Active Particles

As discussed above, this limitation means that the composition is capable of quick drying at least in part due to the active particles. Additionally, based on the Patent Owner's arguments in district court, this definition encompasses compositions with increased moisture vapor transport capacity due to the inclusion of activated particles. (Ex. 1026 at pp. 4-5.)

Halley discloses utilizing carbon, titanium dioxide, zinc oxide, iron oxide, aluminum oxide, and silica particles which overlap with the active particles disclosed in the '287 Patent. (Ex. 1003 at p. 3:1-7; Ex. 1001 at Col. 4:22-27.)

Halley also recites that carbon particles can be utilized to increase the MVTR of a composition. (Ex. 1003 at p. 9:1-5.) As such, *Halley* discloses the above limitation. (Ex. 1005 at ¶ 217.)

F. Ground 4: Claims 38-39 Are Obvious Over *Halley* In View Of *Haggquist*

The following claim chart shows the disclosure of each limitation of claims 38-39 in *Halley* in view of *Haggquist*.

Claim No.	8,945,287	*Halley* in view of *Haggquist*
38	The composition of claim 27 further comprising: at least one removable encapsulant in an amount effective to prevent at least a substantial portion of the active particles from being deactivated prior to removal of the removable encapsulant, and wherein the removable encapsulant is removable to reactivate at least a portion of the active particles to improve the moisture vapor transport capacity of the composition.	*See* independent claim 27. ***Haggquist*** ▪ "The active particles can include, but are not limited to, activated carbon, graphite, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester Cinnamic acid (cinoxate), zinc oxide, zealites, titanium dioxide, molecular filter type materials, and other suitable materials." (Ex. 1004 at ¶ 30.) ▪ "The invention relates to preserving the properties of active particles through use of an encapsulant which may be removable. The encapsulant may protect the active particles against premature deactivation. If desired, the encapsulant may be removed to rejuvenate the active particles. Various processes can be implemented to introduce encapsulated particles to embedding substances which may be used in various products." (*Id*. at Abstract.) ▪ "Active particles can provide performance

		enhancing properties such as odor adsorption, moisture management, ultraviolet light protection, chemo-protective properties, bio-hazard protective properties, fire retardance, antibacterial protective properties, antiviral protective properties, antifungal protective properties, antimicrobial protective properties, and combinations thereof.." (*Id*. at ¶ 30.)
39	The composition of claim 38, wherein the at least one removable encapsulant is selected from the group consisting of: water-soluble surfactants, surfactants, salts, polymer salts, polyvinyl alcohols, waxes, photo-reactive materials, degradable materials, bio-degradable materials, ethoxylated acetylenic diols, starches, lubricants, glycols, corn starch, mineral spirits, organic solvents, paraffinic solvents, and any suitable combination thereof.	*See* independent claim 27 and dependent claim 38. ***Haggquist*** ▪ "The encapsulant can include, but is not limited to, water-soluble surfactants, surfactants, salts (e.g., sodium chloride, calcium chloride), polymer salts, polyvinyl alcohols, waxes (e.g., paraffin, carnauba), photo-reactive materials, degradable materials, biodegradable materials, ethoxylated acetylenic diols, and any other suitable substances.." (*Id*. at ¶ 33.)

A POSITA would have had multiple reasons to combine *Halley* and *Haggquist* with a reasonable expectation of successfully arriving at the claimed

subject matter. (Ex. 1005 at ¶¶ 220-230.) As shown in the above claim chart, the combination of *Halley* and *Haggquist* discloses all of the limitations of claims 38-39. (*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.)

1. Reasons to Combine and Reasonable Expectation of Success in Combining *Halley* And *Haggquist* to Arrive at Claims 38-39

Reason to Combine the References*:* A POSITA would have had several reasons to combine *Halley* and *Haggquist* before May 9, 2006 because: (1) both references teach adding particles to a substrate to add performance enhancing characteristics, such as moisture management, for garments, such as clothing; (2) both references use activated carbon, aluminum oxide, silica gel, zinc oxide, and titanium dioxide particles to add performance enhancing characteristics to garments; and (3) *Haggquist* discloses systems and methods for protecting the performance enhancing characteristics of the active particles specifically listed in *Halley* from premature deactivation. (Ex 1003 at Abstract, p. 2:1-5, p. 3:1-7; Ex. 1004 at Abstract, ¶ 13 and 30; Ex. 1005 at ¶ 220-230.)

Halley and *Haggquist* are analogous art. Both *Halley* and *Haggquist* add particles to a substrate to provide performance enhancing characteristics to the substrate. (Ex. 1003 at p. 2:1-5; Ex. 1004 at ¶ 3.) *Halley* teaches that the incorporation of a particulate solid in a polymer coating improves the MVTR of

the polymer coating. (Ex. 1003 at p. 2:1-5, and p. 9:1-5.) *Haggquist* recites that "[i]t is well known that certain particles can be used to add performance properties to materials in different forms such as gases, liquids, and solids … that are suitable for odor adsorption, moisture management…" (Ex. 1004 at ¶ 3.)

Both *Halley* and *Haggquist* disclose that these added performance properties can be utilized to improve clothing and other outdoor protective gear. (Ex. 1003 at Abstract; Ex. 1004 at ¶ 81.) For example, *Halley* recites, "The composite material may further take the form of a garment, a tape, a tent, a sleeping bag, or other forms where a lightweight, waterproof water-vapour-permeable material is desirable." (Ex. 1003 at Abstract.) For instance, *Haggquist* recites: "The treated materials can also be used in clothing…In addition, hunting gear can be made using the treated materials of the present invention." (Ex. 1004 at ¶ 81.)

Additionally, both *Halley* and *Haggquist* disclose use of the same types of particles. *Halley* specifically discloses utilizing particles of carbon, titanium dioxide, zinc oxide, iron oxide, aluminum oxide, silica, talc, mica, tin or silver to improve the MVTR of a substrate. (Ex. 1003 at p. 3:1-7.) *Haggquist* discloses the use of active particles, which include activated carbon, graphite, aluminum oxide (activated alumina), silica gel, zinc oxide, titanium dioxide, molecular filter-type materials, and other suitable materials, to provide odor adsorption, moisture management and other properties to garments. (Ex. 1004 at ¶ 30.) As such, both

Halley and *Haggquist* disclose use of the same types of particles to provide performance enhancing characteristics to a garment.

Further, a POSITA would have been motivated to utilize the removable encapsulants from Haggquist with the active particles utilized in *Halley,* because *Haggquist* discloses that the encapsulant protects the performance enhancing characteristics of the active particles from premature deactivation, and lists several of the exact same particles that are utilized in *Halley*. (*Id*. at Abstract, ¶¶ 13 and 30.)

A POSITA would want to protect the performance enhancing characteristics of active particles with known methods and materials. As such, a POSITA before May 9, 2006 would have been motivated to combine *Halley* with *Haggquist* to provide materials with protected performance enhancing characteristics. (*Id*. at Abstract, ¶ 13 and 30.)

Reasonable Expectation of Success: A POSITA before May 9, 2006 would have reasonably expected the encapsulation benefits of *Haggquist* to apply to and succeed with the particles utilized in *Halley* since both disclose the use of the same particles. (Ex. 1005 at ¶ 229-230.)

A POSITA before May 9, 2006 understood the importance of protecting active particles from premature deactivation. (*See, e.g.*, Ex, 1004 at Abstract, ¶ 13 and 30.) The combination of the encapsulant method disclosed in *Haggquist* with

the carbon, titanium dioxide, zinc oxide, iron oxide, aluminum oxide, and/or silica particles utilized in *Halley* would work, because *Haggquist* recites these exact same particles as active particles. (*Id.* at ¶ 30.)

When a patent "simply arranges old elements," i.e., adding an encapsulant to known active particles, "with each [element] performing the same function it had been known to perform," i.e., capable of protecting the activating particles and reactivating them upon removal of the encapsulant, "and yields no more than one would expect from such an arrangement," i.e., the effective reactivation of active particles to improve the WVTR, "the combination is obvious." *KSR*, 550 U.S. at 417.

VII. CONCLUSION

For at least the reasons given above, claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent are unpatentable because they are anticipated and/or obvious over the references cited herein. Accordingly, Petitioner respectfully requests IPR of claims 27, 28, 30, 32, 33, and 35-39 of the '287 Patent.

Respectfully submitted,

MERCHANT & GOULD, P.C.

Date: November 15, 2017

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Counsel for Petitioner

CERTIFICATE OF SERVICE ON PATENT OWNER

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that on November 15, 2017, a complete and entire copy of this Petition for *Inter Partes* Review of Patent No. 8,945,287, an accompanying Power of Attorney in *Inter Partes* Review, an Appendix of Exhibits, and supporting Exhibits 1001 - 1042 were provided via UPS, postage prepaid, to the Patent Owner by serving the correspondence address of record for the ’287 Patent.

Attorney of Record
Neugeboren O'Dowd PC
1227 Spruce Street
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Boulder, CO 80302

A courtesy copy of this Petition for Inter Partes Review of Patent No. 8,945,287 was also provided to:

Chad Takashi Nitta
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Respectfully submitted,

MERCHANT & GOULD P.C.

By: */s/ Marianne R. Timm-Schreiber*

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