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Paper No. 14
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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 IPR2018-00190
Patent 8,945,287 B2

Before KRISTINA M. KALAN, CHRISTOPHER M. KAISER, and ELIZABETH M. ROESEL, *Administrative Patent Judges.*

KALAN, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
35 U.S.C. § 314(a)

I. INTRODUCTION

VF Outdoor, LLC ("Petitioner") requests an *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39 of U.S. Patent No. 8,945,287 B2 ("the '287 patent," Ex. 1001). Paper 1 ("Pet."). Cocona, Inc. ("Patent Owner") filed a Preliminary Response. Paper 12 ("Prelim. Resp."). We have authority under 35 U.S.C. § 314(a), which provides that an *inter partes* review may not be instituted unless "there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition." Applying that standard, and upon consideration of the information presented in the Petition and the Preliminary Response, we institute an *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39.

A. Related Proceedings

The parties represent that Patent Owner filed suit against Petitioner for infringement of the '287 patent in *Cocona, Inc. v. Columbia Sportswear Co.*, Civil Action No. 1:16-cv-2703-CMA (D. Colo. Nov. 2, 2016). Pet. 4; Paper 7, 2.

B. The '287 Patent

The '287 patent, titled "Active Particle-Enhanced Membrane and Methods for Making and Using the Same," issued on February 3, 2015. Ex. 1001, at [45], [54]. The '287 patent's "breathable membrane includes a base material solution and active particles;" the "active particles incorporated in the membrane may improve or add various desirable properties to the membrane, such as for example, the moisture vapor transport capability, the odor adsorbance, the anti-static properties, or the stealth properties of the membrane." *Id.* at [57]. Generally, there is a need for a breathable membrane having improved moisture transport properties,

because a garment made from, *e.g.*, rubber may seem "hot and humid" to the wearer because it does not permit moisture to escape from within the garment to the outside environment. *Id.* at 1:43–50. "The membrane can be a self-supporting membrane or a coating on a substrate." *Id.* at 2:13–15. In some embodiments, "the active particles may be encapsulated in 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." *Id.* at 2:31–38.

C. Illustrative Claims

Claim 27 is the only independent claim challenged in the Petition. Claims 28, 30, 32, 33, and 35–39 depend directly or indirectly from claim 27. Claim 27 is reproduced below:

> 27. A water-proof composition comprising:
> a liquid-impermeable breathable cured base material comprising a first thickness;
> a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness; and wherein, the first thickness comprises a thickness at least 2.5 times larger than the second thickness but less than an order of magnitude larger than the second thickness, the active particles improve the moisture vapor transport capacity of the composition, and
> a moisture vapor transmission rate of the water-proof composition comprises from about 600 g/m^2/day to about 11000 g/m^2/day.

Ex. 1001, 12:1–16.

D. Proposed Grounds of Unpatentability

Petitioner asserts that claims 27, 28, 30, 32, 33, and 35–39 of the '287 patent are unpatentable based upon the following grounds:

Reference(s)	Statutory Basis	Claim(s) Challenged
Dutta[1]	§ 102(b)	27, 28, 30, 32, and 36–37
Dutta and Haggquist[2]	§ 103(a)	27, 28, 30, 32, and 35–39
Halley[3]	§ 102(b)	27, 28, 30, 32, 33, and 35–37
Halley and Haggquist	§ 103(a)	38–39

The Petition is supported by the Declaration of Abigail Oelker, Ph.D. Ex. 1005. Patent Owner relies on the Declaration of Dr. Gregory W. Haggquist. Ex. 2001.

II. ANALYSIS

We address below whether the Petition meets the threshold showing for institution of an *inter partes* review under 35 U.S.C. § 314(a). We consider the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art.

Petitioner asserts that one of ordinary skill in the art

> 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

[1] PCT Pub. No. WO 1995/33007 A1, published December 7, 1995 ("Dutta") (Ex. 1002).
[2] U.S. Patent Pub. No. 2004/0018359 A1, published January 29, 2004 ("Haggquist") (Ex. 1004).
[3] PCT Pub. No. WO 2000/70975 A1, published November 30, 2000 ("Halley") (Ex. 1003).

> 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.

Pet. 20. Patent Owner does not appear to dispute Petitioner's definition of one of ordinary skill in the art. At this stage of the proceeding, we adopt Petitioner's uncontested definition of one of ordinary skill in the art. The level of ordinary skill in the art is further demonstrated by the prior art asserted in the Petition. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001).

A. Claim Construction

The Board interprets claims in an unexpired patent using the "broadest reasonable construction in light of the specification of the patent." 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016). Under that standard, claim terms are given their ordinary and customary meaning in view of the specification, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). Any special definitions for claim terms must be set forth with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("we need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy'") (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner presents a "construction of key terms," including the terms "cured base material," "first thickness," "active particles," "second thickness," "order of magnitude," "composition possesses odor absorbance properties at least in part due to the active particles," and "quick drying properties." Pet. 10–16. Patent Owner presents constructions of the terms "active particles" and "first and second thickness." Prelim. Resp. 1–19. Patent Owner does not appear to dispute the construction of the other "key terms" identified by Petitioner.

Below, we address the terms "active particles," "first thickness," and "second thickness." On the present record, we determine that no other claim term requires express construction for purposes of this decision.

i. Active Particles

Petitioner proposes that we construe the term "active particles" to mean "particles capable of causing chemical reactions at their surface or capable of physical reactions, including the ability to adsorb, absorb, or trap substances." Pet. 13 (citing Ex. 1005 ¶ 97–100). In support of its argument, Petitioner points to a portion of the '287 patent that provides: "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." *Id.* at 11 (citing Ex. 1001, 4:4–10). Petitioner also relies on Haggquist, which is incorporated into the '287 patent in its entirety by reference. *Id.* at 12; *see* Ex. 1001, 6:56–60 (discussing "U.S. patent application publication no. 2004/0018359, which is incorporated herein by reference in its entirety."). Haggquist provides that active particles

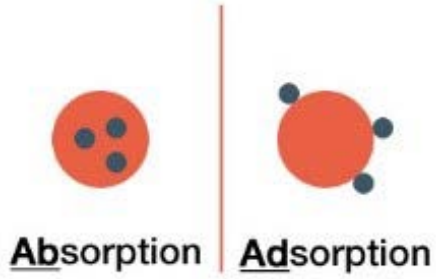
"are active because they have the capacity to adsorb or trap substances." *Id.* (citing Ex. 1004 ¶ 4).

Regarding the "absorb" portion of its proposed claim construction, Petitioner relies on one portion of Haggquist that provides for an "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" and another portion of Haggquist that provides that "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." Pet. 12 (citing Ex. 1004, claim 1, ¶ 14). Petitioner further argues that "the definition of active particles cannot be limited to adsorptive particles, since the '287 Patent discloses other activity in addition to adsorption." *Id.* at 13 (citing Ex. 1001, 6:4–10; Ex. 1005 ¶ 100).

Patent Owner proposes that we construe the term "active particles" to mean "particles that adsorb or trap substances on their surface." Prelim. Resp. 1. Patent Owner first criticizes Petitioner's proposed construction as erroneously encompassing "particles that react by absorption, which is a bulk process that is very different from the surface-active process of adsorption." *Id.* at 2 (citing Ex. 2001 ¶¶ 10–11). According to Patent Owner, each reference to "absorption" in Haggquist is an "obvious typographical error." *Id.* at 6–7 (citing Ex. 2001 ¶¶ 12–13, Ex. 1004 ¶ 4). Patent Owner further criticizes Petitioner's proposed construction as stretching "active particles" to "encompass any particle 'capable of physical reactions,' which includes practically any particle." *Id.* at 2.

Patent Owner points to numerous instances in the '287 patent specification and in Haggquist that discuss "active particles." *Id.* at 2–5. The gist of Patent Owner's arguments, based on these instances, is that 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" and that active particles "have an adsorptive property" because "each particle has a large surface area made up of a multitude of pores." *Id.* at 3–5 (citing Ex. 1001, 4:4–10, 4:12–21).

Patent Owner presents the following image to depict the "difference between the surface-active process of adsorption (shown on the right) and the bulk dissolution process of absorption (shown on the left)." *Id.* at 6.



Accordingly, Patent Owner argues that a person of ordinary skill in the art would have recognized that "the references to absorption are obvious typographical errors because the pores of an active particle are blocked (*e.g.*, deactivated) by adsorption, not by absorption." *Id.* at 10.

We are not directed to any mention of absorption in the specification of the '287 patent. We note Dr. Haggquist's testimony that the portion of Haggquist that mentions absorption can be attributed to a typographical error. Ex. 2001 ¶¶ 12–13. Dr. Haggquist is the named inventor of both the '287 patent and the prior art submitted as "Haggquist," as well as being

the co-founder and Chief Technology Officer of Patent Owner. Ex. 1001, at [75]; Ex. 1004, at [76]; Ex. 2001 ¶ 3–4. We recognize that, both as the named inventor of the '287 patent and as an officer of Patent Owner, Dr. Haggquist may have an interest in upholding the '287 patent, but we also recognize that, as the named inventor of the '287 patent, he has unique insight into whether a typographical error exists in an application he submitted. We also are mindful that, in a preliminary proceeding, our decision "will take into account a patent owner preliminary response where such a response is filed, including any testimonial evidence," but that "a genuine issue of material fact created by such testimonial evidence will be viewed in the light most favorable to the petitioner solely for purposes of deciding whether to institute an *inter partes* review." 37 C.F.R. § 42.108(c). Petitioner has not presented any evidence to address whether a typographical error existed, nor has Petitioner requested a reply to address the alleged typographical error. Weighing these facts, and considering the testimony along with the substance of these two references, we believe it is an open question as to whether or not the references to "absorption" in Haggquist are typographical errors. Even if they are not typographical errors, there is a further open question as to whether the references to "absorption" in Haggquist modify the definition of "active particles" in the '287 patent. Ex. 1001, 4:4–10. *See, e.g., Biogen Idec, Inc. v. GlaxoSmithKline LLC*, 713 F.3d 1090, 1097 (Fed. Cir. 2013) (express definition in patent incorporated by reference into the patent-in-suit "does not necessarily reflect how a person of ordinary skill in the art would understand the disputed term in the context of the [patent-in-suit]").

Although we do not have a complete record before us regarding the alleged typographical errors in Haggquist and how they affect the construction of "active particles" in the '287 patent, we anticipate that a full record will be developed at trial. Notwithstanding the discussion about absorption, the specification states that "active particles" are particles that "have the capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances." Ex. 1001, 4:4–10. Haggquist, which is incorporated by reference into the '287 patent specification, states that "active particles" are particles that "have the capacity to adsorb or trap substances." Ex. 1004 ¶ 4. We have considered the language from Haggquist, but take our construction directly from the specification (Ex. 1001, 4:6–8), as this appears to comport most closely with the applicant's intended lexicography. Applying our governing principles of broadest reasonable interpretation, we construe "active particles" as "particles that have the capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances."

ii. First Thickness

Petitioner proposes that we construe the term "first thickness" as "the thickness of the water-proof composition, which includes the base material and the active particles." Pet. 11. Petitioner relies on the prosecution history, in which the applicant stated that support for a certain claim amendment "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.* at 10 (citing Ex. 1007, 17). The membrane in Example 1, Petitioner argues, includes both the base material and the active particles. *Id.* at 10–11 (citing Ex. 1001, 8:51–61).

Patent Owner proposes that we construe the term "first thickness" as "first layer or membrane." Prelim. Resp. 14. Patent Owner points to the language of claim 27, which provides for a water-proof composition comprising "a liquid-impermeable breathable cured based material comprising a first thickness." *Id*. at 13 (citing Ex. 1001, claim 27). Petitioner's proposed construction, Patent Owner argues, "improperly re-writes a number of limitations in the claim," including re-writing the claim to make the "water-proof composition" of the claim preamble the "first thickness," instead of the "cured base material." *Id.* at 17. Patent Owner disputes that the applicant's statements in the prosecution history support Petitioner's proposed construction, pointing to a portion of the prosecution history in which the applicant stated that "the cured base material solution comprises a first thickness." *Id.* at 18 (citing Ex. 1007, 17).

The term "first thickness" is present in independent claims 1, 27, 40, and 45. Claim 1 provides for "a substantially liquid-impermeable cured base material solution comprising a first thickness." Claim 27 provides for "a liquid-impermeable breathable cured base material comprising a first thickness." Claims 40 and 45 provide for "a base material comprising a first thickness." The term "first thickness" also is present in dependent claims 51–58, each of which depends directly from an independent claim and each of which further defines the dimensions or relative dimensions of the first thickness. The specification does not otherwise appear to define "first thickness." The use of the open-ended term "comprising" in the claims indicates that the base material may have other properties apart from a thickness, so it would be inaccurate to directly equate the two, *i.e.*, to say that "first thickness" means "a base material." The specification and the

prosecution history demonstrate that the "first thickness" may include active particles. Ex. 1001, 8:54–61; Ex. 1007, 17. Applying our governing principles of broadest reasonable interpretation to these portions of the specification, particularly to the independent claims, and to the prosecution history, we construe "first thickness" to mean "the thickness of a base material," which base material may include active particles.

iii. Second Thickness

Petitioner proposes that we construe the term "second thickness" as "the particle size of the active particles." Pet. 14. Petitioner relies on the prosecution history, in which the applicant stated that support for the "second thickness" claim amendment was found in a product data sheet indicating that "the particle size for the Asbury 5564TM powdered coconut activated carbon comprises about 10 microns (second thickness)." *Id.* at 13–14 (citing Ex. 1007, 17). Accordingly, argues Petitioner, the applicant "states that the second thickness is equivalent to the particle size of the active particles utilized in this example." *Id.* at 14.

Patent Owner proposes that we construe the term "second thickness" as "second layer or membrane." Prelim. Resp. 14. Patent Owner points to the language of claim 27, which provides for a water-proof composition comprising "a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness." *Id.* (citing Ex. 1001, claim 27). Patent Owner also points to portions of Haggquist discussing certain ways of incorporating the principles of Haggquist's invention into different methods. *Id.* at 15–16.

The term "second thickness" is present in independent claims 1, 27, 40, and 45. Claim 1 provides for "a plurality of active particles in contact with the substantially liquid-impermeable cured base material solution," wherein the plurality of active particles "comprise a second thickness." Claim 27 provides for "a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness." Claims 40 and 45 provide for "a plurality of active particles in contact with the base material, the plurality of active particles comprising a second thickness." The term "second thickness" also is present in dependent claims 55–62, each of which depends from an independent claim and each of which further defines the dimensions of the second thickness. The specification does not otherwise appear to define "second thickness." The use of the open-ended term "comprising" in the claims indicates that the active particles may have other properties apart from a thickness, so it would be inaccurate to directly equate the two, *i.e.*, to say that "second thickness" means "a plurality of active particles." During prosecution, the applicant equated "the second thickness" with the particle size of the active particles. Ex. 1007, 17. Applying our governing principles of broadest reasonable interpretation to these portions of the specification and the prosecution history, we construe "second thickness" to mean "the thickness of a plurality of active particles," which may be the particle size of the active particles.

B. Overview of the Asserted References

i. Dutta

Dutta, titled "Water Vapor Permeable, Air Impermeable Film and Composite Coatings and Laminates," relates to compositions for "controlled

increase in [water vapor transmission rate] of a non-porous polymer film or of composites containing it." Ex. 1002, at [54], [57]. More particularly, Dutta's material "can be in the form of a waterproof, air permeable, water vapor permeable non-porous polymer film or sheet made of a polymer resin and hydrophilic absorbent particles having absorptive capacity greater than 1 gram of water per gram of dry (water-free) particles." *Id.* at [57]. Dutta provides details regarding the size of its absorbent-type particles (*id.* at 9:19–22) and orientation of the absorbent-type particles relative to the polymer resin (*id.* at 10:37–11:14 (partially embedded or dispersed); *id.* at 12:26–27 (layered)). In its Examples, Dutta provides further details regarding the composition of its materials, using SOLUCOTE TOP 932 and Nalco 1181 in its Example 1A and SOLUCOTE TOP 932 and Sephadex G-200-50 in its Example 1B. *Id.* at 17:31–18:21. Dutta presents a Table comparing the properties of the films created in Examples 1A and 1B to Comparative Example 1. *Id.* at 23:1–8.

ii. Halley

Halley, titled "Coated Membrane," is directed to "a composite material which comprises a substrate and a continuous polymer coating applied to the substrate, the polymer containing a particulate solid and being imbibed into a face of the porous substrate; and the solid particles being distributed non-uniformly through depth of the polymer coating." Ex. 1003, at [54], [57]. Halley provides that 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" and that, generally, "the coating has a thickness of 5 to 100 microns." *Id.* at 2:24–34. The "particulate solid

is incorporated into the water-vapour-permeable polymer, generally before the polymer coating is applied to the substrate." *Id.* at 3:1–3. Halley further provides that the particulate solid may be "carbon particles" or "inorganic particulate materials, pigments, metal oxides, metal salts, or metal particles." *Id.* at 3:3–5. The primary particle size is "generally less than 50,000 nm, particularly less than 5,000 nm, especially less than 500 nm, more especially less than 200 nm and most especially less than 50 nm." *Id.* at 3:10–13. The "primary particles may cluster together to form aggregates (typically 1 to 100, 1 to 20, or 1 to 5 microns median particles size)." *Id.* at 3:14–15.

iii. Haggquist

Haggquist, titled "Encapsulated Active Particles and the Methods for Making and Using the Same," relates to "preserving the properties of active particles through use of an encapsulant which may be removable." Ex. 1004, at [54], [57]. Haggquist provides that its 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 [*sic*, zeolites], titanium dioxide, molecular filter type materials, and other suitable materials." *Id.* ¶ 30. Haggquist's encapsulants can include, but are 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 dials, and any other suitable substances." *Id.* ¶ 33.

C. Asserted Anticipation Based on Dutta

Petitioner asserts that claims 27, 28, 30, 32, and 36–37 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Dutta. Pet. 21–37. Petitioner presents a claim chart to demonstrate where Petitioner contends every element of the challenged claims is found in Dutta. *Id.* at 21–32.

Regarding claim 27, Petitioner contends that Dutta discloses:

(1) a liquid-impermeable breathable cured base material comprising a first thickness, "in the creation of the polyurethane film from the drying and heating of a polyurethane solution," which polyurethane film has a thickness that includes the base material and the active particles, as shown in Table 1 (*id.* at 33);

(2) a plurality of active particles in contact with the liquid-impermeable breathable cured base material, with Dutta's disclosure of absorbent particles or Sephadex particles in contact with or layered on a liquid-impermeable breathable cured base material (*id.* at 22–23, 34);

(3) the plurality of active particles comprising a second thickness, with Dutta's disclosure of a plurality of absorbent-type particles sized from 0.1 to 300 micrometers or Sephadex particles sized from 20–50 micrometers (*id.* at 23, 34–35);

(4) 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, with the claimed thickness ratio shown in Example 1B and Table 1 in Dutta (*id.* at 35); and

(5) that the active particles improve the moisture vapor transport capacity of the composition, and that a moisture vapor transmission rate ("MVTR") of the water-proof composition comprises from about 600

$g/m^2/day$ to about 11000 $g/m^2/day$ due to the addition of active particles, with Dutta's disclosure of an improved water vapor transmission rate in Example 1B in Dutta of 6730 $g/m^2/day$ (*id.* at 36).

Patent Owner contends, first, that the Petition fails to show how Dutta discloses "active particles." Prelim. Resp. 22. Patent Owner faults Petitioner for its reliance on an "overly-broad construction for 'active particles' that is designed to manufacture anticipation using a reference that does not disclose 'active particles.'" *Id.* Rather, Patent Owner argues, Dutta discloses "absorbent particles" such as hydrophilic absorbent Sephadex particles, "which are not active particles." *Id.* at 22–23. Petitioner, however, presents evidence that Sephadex, in addition to being an absorbent particle, is also an adsorbent particle capable of trapping water and other substances. Pet. 34 (citing Ex. 1023, 143; Ex. 1005 ¶¶ 117–125). On this record, and given that our construction that the term "active particles" means "particles that have the capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances," we are persuaded by Petitioner's arguments that Sephadex is an active particle.

Patent Owner contends, next, that "the Petition fails to specifically show how the 'first thickness' element, as properly construed, is met by Dutta." Prelim. Resp. 26. More particularly, Patent Owner contends that "the Petition fails to specifically show that Dutta discloses a two-layer waterproof composition comprising a base material (a first "layer or membrane") and a plurality of active particles (a second "layer or member") as claimed." *Id.* Patent Owner also argues that "the Petition fails to specifically show how Dutta discloses the 'second thickness' as claimed." *Id.* at 27. More particularly, Patent Owner contends that the citations to

Dutta relied on by Petitioner disclose the size of individual particles, rather than the "second layer or membrane." *Id.*

As a preliminary matter, we disagree with Patent Owner's contention that claim 27 requires a two-layer construction. *See* Sections II.A.ii and II.A.iii, *supra* (claim constructions for "first thickness" and "second thickness"). We have not been directed to any portion of the '287 patent specification that requires the claimed composition to be a water-proof composition with two distinct layers. The portions of the specification that discuss the relationship between the active particles and the base material indicate that the active particles may be intermixed with the base material. *See*, *e.g.*, Ex. 1001, 2:24–25 (the "active particles incorporated in the membrane"); 2:52–54 (the "encapsulated [active] particles are incorporated into the base material solution"); 8:55–57 (the "activated carbon was suspended in the polyurethane solution and the mixture was applied to a nylon woven fabric" in Example 1); *see also* Ex. 1004, Figs. 4, 5 (Haggquist, incorporated by reference in its entirety into the '287 specification, showing that "some of the encapsulated [active] particles may be fully contained within the extruded material and other particles may extend beyond the outer surface of the base material or are exposed to the ambient environment"). Thus, there do not appear to have to be two distinct layers of base material and active particles, as urged by Patent Owner.

Regarding the "first thickness," Petitioner relies on Example 1B in Table 1 of Dutta to disclose the thickness of the base material. Pet. 33. Table 1 discloses the thickness of Example 1B (with Sephadex particles) to be 0.0030 inches. We have construed "first thickness" to mean "the thickness of a base material," which base material may include active

particles. Claim 27 requires a "cured base material comprising a first thickness." As noted above, the specification's discussion of the base material indicates that the active particles may be intermixed with the base material before it is cured. *See also* Ex. 1001, 6:65–7:29, Fig. 1 (indicating "base material solution and the active particles may be mixed together" at Step 130 prior to curing as discussed in Steps 140 and 150). Thus, on the present record, Petitioner's reliance on Example 1B of Dutta is sufficient to support institution.

Regarding the "second thickness," Petitioner relies on the thickness of Dutta's absorbent-type particles or Sephadex particles, "particles sized from 0.1 to 300 micrometers, 0.1 to 100 micrometers, or 20–50 micrometers." Pet. 34–35. We have construed "second thickness" to mean "the thickness of a plurality of active particles," which may be the particle size of the active particles. Claim 27 does not require that the active particles be present in a layer, let alone a layer of any particular depth or configuration of active particles. Rather, it appears from the specification that the plurality of active particles may be dispersed throughout the base layer. *See*, *e.g.*, Ex. 1001, 2:24–25, 2:52–54, 8:55–57. At any given point in the base layer, the "second thickness" may be the thickness of a single particle. It may also be the thickness of an aggregate of particles, but Patent Owner does not direct us to any requirement that the particles be arranged in any particular fashion. Thus, on the present record, Petitioner's reliance on the particle size of Dutta's particles is sufficient to support institution.

Based upon our review of the parties' positions set forth in the Petition and Preliminary Response, we are persuaded, at this stage of the proceeding, by Petitioner's presentation of the evidence based on Dutta.

Independent claim 27 recites a water-proof composition comprising a base material with a first thickness and a plurality of active particles with a second thickness, and further recites the ratio of the first and second thicknesses, an improved moisture vapor transport capacity due to the active particles, and a moisture vapor transmission rate. Ex. 1001, 12:1–16. Petitioner presents reasonable arguments that Dutta discloses these limitations with its composition. Pet. 21–37. Petitioner supports its argument that the composition of the claimed invention is anticipated by Dutta with citations to Dr. Oelker's Declaration. Pet. 32–37 (citing Ex. 1005 ¶¶ 108–137). On this record, Petitioner has made a sufficient showing that the limitations of the challenged independent claim are disclosed by Dutta.

Regarding the challenged dependent claims, Petitioner presents arguments and a claim chart persuading us that it has established a reasonable likelihood of prevailing on the remaining limitations of those claims in the ground based on Dutta. Pet. 21–37. Accordingly, on the present record, we find that Petitioner has demonstrated a reasonable likelihood that Dutta anticipates dependent claims 28, 30, 32, and 36–37 as well as independent claim 27.

D. Asserted Obviousness Based on Dutta and Haggquist

Petitioner asserts that a person of ordinary skill in the art would have been led from the above-referenced disclosures of Dutta and Haggquist to a composition comprising all of the elements recited in claims 27, 28, 30, 32, and 35–39. Pet. 37. Petitioner relies on its claim chart to show the disclosure of each limitation of these claims in Dutta in view of Haggquist. *Id.* (referring to Section VI.C).

First, Petitioner argues, even if the Sephadex particles disclosed in Dutta are not active particles, Haggquist discloses active particles that can be substituted for the Sephadex particles used in Dutta's Example IB. *Id.* at 38. Next, regarding the "plurality of active particles comprising a second thickness," Petitioner argues that Haggquist discloses a plurality of carbon particles with a diameter of 10 microns. *Id.* at 39. Further, this diameter range from Haggquist could be combined with the first thickness of 0.0030 inches from Dutta to meet the claimed thickness ratio, according to Petitioner's calculations. *Id.* at 39–40. Because Haggquist discloses active particles that trap water and have moisture management properties, and because the '287 patent discloses that adding activated carbon to cured polyurethane solution improves MVTR, Petitioner argues that Dutta in view of Haggquist discloses the improved MVTR of the claims. *Id.* at 40–41.

Petitioner provides a number of reasons to combine the references:

> (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; (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; (4) *Haggquist* discloses that "molecular filter-type materials" are suitable activated particles and the Sephadex particles in *Dutta* are molecular filter-type materials; and (5) *Haggquist* discloses systems and methods (removable encapsulants) for protecting the performance enhancing characteristics of active particles, including moisture management.

Id. at 43 (citations omitted). Petitioner further argues that one of ordinary skill in the art would have had a reasonable expectation of success, and "would have reasonably expected the substitution of the active particles disclose[d] 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." *Id.* at 47.

Patent Owner argues that "Ground 2 should be denied for at least the reasons given with respect to the denial of Ground 1." Prelim. Resp. 28.

At this stage in the proceeding, and on the current record, we are persuaded by Petitioner's evidence and find Petitioner shows sufficiently that Dutta and Haggquist disclose the limitations of claims 27, 28, 30, 32, and 35–39, and that one of ordinary skill in the art would have been motivated to combine the teachings of the references with a reasonable expectation of success. Accordingly, on the present record, we find that Petitioner has demonstrated a reasonable likelihood that claims 27, 28, 30, 32, and 35–39 would have been obvious over the combination of Dutta and Haggquist.

E. Asserted Anticipation Based on Halley

Petitioner asserts that claims 27, 28, 30, 32, 33, and 35–37 are unpatentable under 35 U.S.C. § 102(b) as anticipated by Halley. Pet. 50–60. Petitioner presents a claim chart to demonstrate where Petitioner contends every element of the challenged claims is found in Halley. *Id.* at 50–56.

Petitioner contends that Halley discloses:

(1) a liquid-impermeable breathable cured base material comprising a first thickness, because Halley "uses a water-vapour-permeable hydrophilic

polymer material, such as a cured polyurethane solution," which polyurethane film has a thickness of 5–100 microns, or 10–200 microns, 70–140 microns, and 80–100 microns (*id.* at 51, 57);

(2) a plurality of active particles in contact with the liquid-impermeable breathable cured base material, with Halley's disclosure of particulate solids, including carbon particles (*id.* at 51, 57);

(3) the plurality of active particles comprising a second thickness, with Halley's disclosure of particulates having a thickness of 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 (*id.* at 57);

(4) 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, with the claimed thickness ratio calculated between the "first thickness" and "second thickness" of Halley (*id.* at 52, 58); and

(5) that the active particles improve the moisture vapor transport capacity of the composition, and that a MVTR of the water-proof composition comprises from about 600 g/m2/day to about 11000 g/ m^2/day due to the addition of active particles, with Halley's disclosure of a MVTR in Table 3 upwards of 6924 g/m^2/day (*id.* at 52–53).

Patent Owner contends, first, that the Petition fails to show how Halley discloses "active particles." Prelim. Resp. 28. Patent Owner faults Petitioner for its reliance on an "overly-broad construction for 'active particles'" and for its failure to "specifically identify active particles in Halley." *Id.* Rather, Patent Owner argues, Halley discloses "particulate solids" such as "carbon particles," and this disclosure "does not disclose

surface-active particles that adsorb or trap substances on their surface." *Id.* Petitioner, however, does present evidence that the particles identified in Halley are "active particles," particularly, that the carbon particles are absorbent particles capable of adsorbing or trapping water. Pet. 51, 57 (citing Ex. 1003, 3:8–20; Ex. 1005 ¶¶ 202–206 (discussing why the carbon particles disclosed by Halley are "active particles;" citing Ex. 1028, 284). On this record, and given that our construction that the term "active particles" means "particles that have the capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances," we are persuaded by Petitioner's arguments that Halley's particles are active particles.

Patent Owner contends, next, that "the Petition fails to specifically show how the 'first thickness' element, as properly construed, is met by Halley." Prelim. Resp. 30. More particularly, Patent Owner contends that the Petitioner fails to "show that Halley discloses a two-layer water-proof composition comprising a base material (a first 'layer or membrane') and a plurality of active particles (a second 'layer or membrane') as claimed." *Id.* at 31. Patent Owner also argues that "the Petition fails to specifically show how Halley discloses the 'second thickness' as claimed." *Id.* at 32. More particularly, Patent Owner contends that the citations to Halley relied on by Petitioner disclose the "primary particle size," rather than the "second thickness" element of the claims. *Id.*

As discussed above, we do not construe claim 27 as requiring a two-layer construction, and we are not directed to any portion of the '287 patent specification that requires the claimed composition to be a water-proof composition with two distinct layers. Thus, there does not appear to have to

be two distinct layers of base material and active particles, as urged by Patent Owner.

To disclose the first thickness, Petitioner relies on Halley's disclosure that generally "the coating has a thickness of 5 to 100 microns" and specifically, the height of the "dots" of polymeric material that may be provided on the coating may have a thickness of 10–200 microns. Pet. 51. We have construed "first thickness" to mean "the thickness of a base material," which base material may include active particles. Claim 27 requires a "cured base material comprising a first thickness." As noted above, the specification's discussion of the base material indicates that the active particles may be intermixed with the base material before it is cured. *See also* Ex. 1001, 6:65–7:29, Fig. 1 (indicating "base material solution and the active particles may be mixed together" at Step 130 prior to curing as discussed in Steps 140 and 150). Halley provides that, in its invention, "a particulate solid is incorporated into the water-vapour-permeable polymer, generally before the polymer coating is applied onto the substrate." Ex. 1003, 3:1–3. Thus, on the present record, Petitioner's reliance on this disclosure and on the general and specific disclosures of Halley's coating thickness is sufficient to support institution.

Regarding the "second thickness," Petitioner relies on the thickness of Halley's primary particles, "generally less than 50,000nm, particularly less than 5,000nm, especially less than 500nm, more especially less than 200nm and most especially less than 50nm," as well as the disclosure that the "primary particles may cluster together to form aggregates (typically 1 to 100, 1 to 20, or 1 to 5 microns median particle size)." Pet. 51–52. We have construed "second thickness" to mean "the thickness of a plurality of

active particles," which may be the particle size of the active particles. As we have noted, the '287 patent specification does not appear to require that the active particles be present in a layer, let alone a layer of any particular depth or configuration of active particles. Rather, it appears from the specification that the plurality of active particles may be dispersed throughout the base layer. At any given point in the base layer, the "second thickness" may be the thickness of a single particle. It may also be the thickness of an aggregate of particles, but Patent Owner does not direct us to any requirement that the particles be arranged in any particular fashion. Thus, on the present record, Petitioner's reliance on Halley's particle size or aggregate particle size is sufficient to support institution.

Based upon our review of the parties' positions set forth in the Petition and Preliminary Response, we are persuaded, at this stage of the proceeding, by Petitioner's presentation of the evidence based on Halley. Independent claim 27 recites a water-proof composition comprising a base material with a first thickness and a plurality of active particles with a second thickness, and further recites the ratio of the first and second thicknesses, an improved moisture vapor transport capacity due to the active particles, and the moisture vapor transmission rate. Ex. 1001, 12:1–16. Petitioner presents reasonable arguments that Halley discloses these limitations with its composition. Pet. 50–60. Petitioner supports its argument that the composition of the claimed invention is anticipated by Halley with citations to Dr. Oelker's Declaration. Pet. 56–60 (citing Ex. 1005 ¶ 194–210, 216–217). On this record, Petitioner has made a sufficient showing that the limitations of the challenged independent claim are disclosed by Halley.

Regarding the challenged dependent claims, Petitioner presents arguments and a claim chart persuading us that it has established a reasonable likelihood of prevailing on the remaining limitations of those claims in the ground based on Halley. Pet. 53–60. Accordingly, on the present record, we find that Petitioner has demonstrated a reasonable likelihood that Halley anticipates dependent claims 28, 30, 32, 33, and 35–37 as well as independent claim 27.

F. Asserted Obviousness Based on Halley and Haggquist

Petitioner asserts that a person of ordinary skill in the art would have been led from the above-referenced disclosures of Halley and Haggquist to a composition comprising the elements recited in claims 38 and 39. Pet. 60–65. Petitioner presents a claim chart indicating where it contends each element of claims 38 and 39 is to be found in those references. *Id.* at 60–61.

Petitioner provides a number of reasons to combine the references:

> (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.

Id. at 62. Petitioner further argues that one of ordinary skill in the art would have had a reasonable expectation of success, and "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." *Id.* at 64.

Patent Owner argues that "Ground 4 should be denied for at least the reasons given with respect to the denial of Ground 3." Prelim. Resp. 32–33.

At this stage in the proceeding, and on the current record, we are persuaded by Petitioner's evidence and find Petitioner shows sufficiently that Halley and Haggquist disclose the limitations of claims 38 and 39, and that one of ordinary skill in the art would have been motivated to combine the teachings of the references with a reasonable expectation of success. Accordingly, on the present record, we find that Petitioner has demonstrated a reasonable likelihood that claims 38 and 39 would have been obvious over the combination of Halley and Haggquist.

G. Conclusion

Taking account of the information presented in the Petition and the Preliminary Response, and the evidence of record, we determine that Petitioner establishes a reasonable likelihood that it will prevail in showing that claims 27, 28, 30, 32, 33, and 35–39 of the '287 patent are unpatentable. Our factual findings and conclusions at this stage of the proceeding are based on the evidentiary record developed thus far, and may change upon consideration of the full record developed during trial. This decision is not a final decision as to the patentability of any claim for which *inter partes* review is instituted. Our final decision will be based on the full record developed during trial.

III. ORDER

In consideration of the foregoing, it is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39 of the '287 patent is instituted with respect to all grounds set forth in the Petition; and

FURTHER ORDERED that notice is hereby given of the institution of a trial commencing on the entry date of this decision, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4.

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