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Paper No. 50
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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.*

FINAL WRITTEN DECISION

35 U.S.C. § 318(a)

I. INTRODUCTION

VF Outdoor, LLC ("Petitioner") filed a Petition requesting *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39 of U.S. Patent No. 8,945,287 B2 (Ex. 1001, "the '611 patent"). Paper 1 ("Pet."). Cocona, Inc. ("Patent Owner") filed a Preliminary Response. Paper 12 ("Prelim. Resp."). We instituted an *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39 of the '287 patent on all grounds of unpatentability alleged in the Petition. Paper 14 ("Institution Decision" or "Dec.").

After institution of trial, Patent Owner filed a Patent Owner Response. Paper 20 ("PO Resp."). Petitioner filed a Reply. Paper 33 ("Reply"). Patent Owner filed a Sur-Reply. Paper 40 ("Sur-Reply"). An oral hearing was held on February 28, 2019. A transcript of the hearing is included in the record. Paper 49 ("Tr.").

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner has established by a preponderance of the evidence that claims 27, 28, 30, 32, 33, and 35–37 of the '287 patent are unpatentable, but Petitioner has not established that claims 38 and 39 of the '287 patent are unpatentable.

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," was 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 Claim

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. Instituted Grounds of Unpatentability

We instituted an *inter partes* review of claims 27, 28, 30, 32, 33, and 35–39 of the '287 patent on the following grounds. Dec. 4, 28–29.

References	**Basis**	**Claims 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 and 39

Petitioner relies on the Declarations of Abigail Oelker, Ph.D. Ex. 1005; Ex. 1044. Patent Owner relies on the Declarations of Dr. Gregory W. Haggquist. Ex. 2001; Ex. 2011.

[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).

II. ANALYSIS

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) (2017).[4] 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

[4] Our recently changed version of this Rule, which requires that we interpret claims in the same manner used in a civil action under 35 U.S.C. § 282(b), does not apply here because the Petition was filed before the effective date of the new Rule, November 13, 2018. *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,344 (Oct. 11, 2018).

properties." Pet. 10–16. In our Institution Decision, we addressed the terms "active particles," "first thickness," and "second thickness." Dec. 5–13. Patent Owner presents constructions of the terms "active particles" and "first and second thickness." PO Resp. 6–23. Patent Owner does not appear to dispute the construction of the other "key terms" identified by Petitioner. We discuss the terms "active particles," "first thickness," and "second thickness" below. On the complete record, we determine that it is not necessary to provide an express construction for any other claim term for purposes of resolving the controversy. *See, e.g.*, *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("[C]laim terms need only be construed 'to the extent necessary to resolve the controversy.'") (quoting *Vivid Techs.*, 200 F.3d at 803).

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 Haggquist's disclosure that 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" (Ex. 1004, claim 1) and its disclosure 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" (*id.* ¶ 14). Pet. 12.[5] 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).

In our Institution Decision, we relied on the statement in the '287 patent's specification that "active particles" are particles that "have the

[5] Patent Owner took steps to correct the portion of this quote that refers to "absorption occurring at an undesirably early time" (Ex. 1004 ¶ 14) and one other instance of the word "absorbed" in Haggquist, which is incorporated by reference into the '287 patent (Ex. 1001, 6:58–60). Patent Owner applied for a Certificate of Correction on August 31, 2018, and obtained a Certificate of Correction on Haggquist on October 2, 2018 Ex. 2029; Ex. 2030 (making three corrections, including changing "absorption" to "adsorption" and "absorbed" to "adsorbed" in U.S. Patent No. 7,247,374 B2, which was published as U.S. Patent Application Publication No. 2004/0018359, Ex. 1004). We do not address the propriety of this course of action, other than to say that the removal of the references to "absorption" and "absorbed" in Haggquist does not change the language of the specification of the '287 patent on which we rely.

capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances." Dec. 9–10 (citing Ex. 1001, 4:4–10). We also looked to Haggquist, which is incorporated by reference into the '287 patent specification and states that "active particles" are particles that "have the capacity to adsorb or trap substances." *Id.* at 10 (citing Ex. 1004 ¶ 4). We took our Institution Decision construction directly from the specification of the '287 patent (*id.* (citing Ex. 1001, 4:6–8)), as this appeared to comport most closely with the applicant's intended lexicography. Applying our governing principles of broadest reasonable interpretation, we construed "active particles" as "particles that have the capacity to cause chemical reactions at the surface or physical reactions, such as, adsorb or trap substances." *Id.*

In its Response, Patent Owner proposed that the proper construction should be "particles that adsorb or trap substances on their surface." PO Resp. 6. Patent Owner criticized our construction as "unreasonably broad, because it encompasses any particle capable of a physical reaction." *Id.* Patent Owner argues that one of ordinary skill in the art "would not consider 'any physical reaction' to be within the scope of the claims, unless it is strictly referring to a physical reaction ***at the surface of the particle***." *Id.* at 11 (citing Ex. 2005 ¶¶ 30–36, Ex. 2006 ¶ 67). Patent Owner points to the specification, arguing that "***every embodiment*** in the Patent speaks to ***activity at the surface***," to urge that "[r]eactions that are not adsorption are not within the scope of the claims." *Id.* at 13; *see also* Sur-Reply 3–6.

Petitioner replies that the '287 patent "explicitly identifies particles as 'active' that a POSITA would understand act by absorption." Reply 2 (citing Ex. 1001, 4:22–27; Pet. 12–13; Ex. 1044 ¶¶ 9–10, 13). Petitioner

points to the "active" particles in the patent specification that "impart various enhancing properties to membranes – such as moisture vapor transport, ultraviolet light protection, chemical protection, and antimicrobial protection – by a variety of different mechanisms of activity," including absorption. *Id.* (citing Ex. 1001, 3:61–4:5, 10:11–18, FIG. 5; Ex. 1044 ¶ 11); *id.* at 3–4 (citing Ex. 1005 ¶¶ 45, 99; Ex. 1044 ¶¶ 11, 14 (indicating that silica gel, identified as an "active particle" in the '287 patent, is an absorbing substance)). Petitioner agrees that the "Board's construction of the term 'active particles' aligns with the term's broadest reasonable interpretation in view of the specification." *Id.* at 4; *see also* Tr. 7:6–8.

On the record now before us, we remain persuaded 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," as stated essentially verbatim in the specification. Ex. 1001, 4:6–8; *see also Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) ("The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication."). 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, states that "active particles" are particles that "have the capacity to adsorb or trap substances." Ex. 1004 ¶ 4. We note that use of the words "such as" in the quoted portion of the '287 patent (Ex. 1001, 4:4–10), into which Haggquist is incorporated, has the effect of broadening the description of "active particles" in the '287 patent as compared with Haggquist. We have considered the language from

Haggquist, including the Certificate of Correction amendments, but we take our construction directly from the '287 patent specification (Ex. 1001, 4:6–8), as this appears to comport most closely with the applicant's intended lexicography. *See Paulsen*, 30 F.3d at 1480. We also agree with Petitioner that the '287 patent covers a broad range of technologies and a wide variety of membranes with active particles performing different functions—not only moisture vapor transport, but also ultraviolet light protection, chemical protection, and antimicrobial protection—by "a variety of different mechanisms of activity." Reply 2 (citing Ex. 1001, 3:61–4:5, 10:11–18, FIG. 5; Ex. 1044 ¶11). This supports a finding that the "active particles" discussed in the patent act by a variety of different mechanisms, and are not merely "particles that adsorb or trap substances on their surface." *See also id.* at 3 (citing Ex. 1001, 6:13–18 (noting that baking soda, cinoxate, zinc oxide, and silica gel act through various absorptive mechanisms); Ex. 2006 ¶ 43 (admitting that silica gel, identified in the '287 patent as an "active particle," acts by absorption). 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).

In our Institution Decision, we construed "first thickness" to mean "the thickness of a base material," which base material may include active particles. Dec. 12. We noted that the '287 patent specification does not appear to define "first thickness," outside of using it in the claims, where its use following the use of the open-ended term "comprising" 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." *Id.* at 11. We also noted that the specification and the prosecution history demonstrate that the "first thickness" may include active particles. *Id.* at 11–12 (citing Ex. 1001, 8:54–61; Ex. 1007, 17).

Patent Owner argues that the proper construction of "first thickness" is "first layer or membrane." PO Resp. 15. Patent Owner highlights 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 14 (citing Ex. 1001, claim 27). Patent Owner argues that the "cured base material" has a "physical dimension referred to as the 'first thickness'" that one of ordinary skill in the art would understand to be a physical dimension of the "cured base material" only and not of other claim elements. *Id.* at 15. Moreover, Patent Owner argues, one of ordinary skill in the art would understand that the "cured base material" of claim 27 is the layer or membrane (i.e. the "substrate") on which the "active particles" are applied, which does not include the plurality of active particles. *Id.* at 16. Patent Owner faults Petitioner for conflating "the 'base

solution' that carries the active particles with the 'base material' recited by claim 27." *Id.* at 17. At oral hearing, Patent Owner again equated the "cured base material" in claim 27 to the "substrate" in the specification. Tr. 61:2–5. Patent Owner differentiated the language of claim 27, which discusses a "cured base material," from the language of claim 1, which is directed to a "cured base material solution," to advance its theory that claim 27 is directed to a two-layer embodiment with the substrate being the cured base material (and having a first thickness). *Id.* at 61:2–18; *see also* Sur-Reply 6–11 (discussing Patent Owner's two-layer embodiment theory).

Petitioner challenges Patent Owner's interpretation of "first thickness" as a "first layer or membrane" that cannot include any active particles. Reply 4. Petitioner notes that the '287 patent specification does not define "first thickness," but "does describe active particles that are mixed and suspended in a solution of base material prior to curing." *Id.* at 5. Because the "'cured mixture' of base material with embedded active particles is described as the 'membrane,' which may also be a 'laminate' or a 'self-supporting membrane' independent of a substrate," Petitioner argues that Patent Owner's construction "excludes these preferred embodiments and therefore is incorrect." *Id.* at 5–6. Petitioner points to a passage in the prosecution history of the '287 patent, in which Patent Owner stated that active particles are "***used in*** such a membrane" having a "first thickness":

> [T]he *Example 1 membrane comprises* a thickness of about l mil, or about 25.4 microns (*the* ***first thickness***) and … the *activated carbon* ***used in such a membrane*** *comprises* Asbury5564™ powdered coconut activated carbon … [with a] particle size … [of] about 10 microns (*the* ***second thickness***).

Id. at 6 (citing Ex. 1007, 17–18 (emphasis added by Petitioner)). This, Petitioner argues, shows that the active particles in Example 1 are "in

contact with" the cured base material comprising a first thickness, because they are "used in" the membrane. *Id.* (citing Ex. 1044 ¶¶ 23, 27). The substrate discussed by Patent Owner, Petitioner argues, "is a separate and distinct component that *may* or *may not* be included in the waterproof composition of claim 27," rather than a "cured base material." *Id.* at 7. Thus, Petitioner agrees that our initial construction is "reasonable based on the claims, specification, and prosecution history of the '287 patent." *Id.* at 1.

After considering the record developed during trial, we make the following findings. The specification does not appear to define "first thickness." The term "first thickness" is present in independent claims 1, 27, 40, and 45, which provide for: "a substantially liquid-impermeable cured base material solution comprising a first thickness" (Claim 1); "a liquid-impermeable breathable cured base material comprising a first thickness" (Claim 27); "a base material comprising a first thickness" (Claims 40, 45); and dependent claims that further define the dimensions or relative dimensions of the first thickness (Claims 51–58). The use of the open-ended term "comprising" in the claims indicates that the base material may have other properties apart from a thickness. *See* Dec. 11.

The specification demonstrates that the base material or base material solution having comprising a "first thickness" may include active particles. Ex. 1001, Fig. 1 (demonstrating "Mix together active particles and base solution" at step 130); 6:65–7:1 ("At step 130, the base material solution and the active particles may be mixed together. The active particles may be dispersed throughout the base material solution to provide a mixture having a uniform consistency."); 8:54–61 (describing, in Example 1, that the

"protected activated carbon was suspended in the polyurethane solution and the mixture was applied to a nylon woven fabric").

Moreover, the prosecution history of the '287 patent demonstrates that the term "first thickness" encompasses the thickness of a layer comprising a mixture of base material and active particles. During prosecution, the applicant amended the claims to add the terms "first thickness" and "second thickness," relying on Example 1 as providing support for the amendment. Ex. 1007, 2, 12–13, 17–18. The applicant's remarks demonstrate that, in Example 1, the "first thickness" is the thickness of a layer comprising a mixture of base material (polyurethane) and active particles (Asbury 5564 activated carbon) where the mixture is applied to a substrate (nylon woven fabric). *Id.* at 17 (discussing the "Example 1 membrane" as having "a thickness of about 1 mil, or about 25.4 microns (the first thickness) and . . . the activated carbon used in such a membrane comprises Asbury 5564 . . . [with a] particle size . . . [of] about 10 microns (the second thickness)"). We note that the first thickness identified here, 25.4 microns, corresponds to one mil (Ex. 1044 ¶ 36), which is the only quantification of the term "thickness" in the '287 patent specification outside of the claims. Ex. 1001, 8:54–61 ("The protected activated carbon was suspended in the polyurethane solution . . . resulting in a membrane coated on a substrate, the membrane having a thickness of one mil.").

We disagree with Patent Owner's contention that claim 27 discloses a "two-layer embodiment" by virtue of its use of the term "cured base material comprising a first thickness," as opposed to claim 1's alleged "one-layer embodiment" by virtue of its reference to "cured base material solution comprising a first thickness." PO Resp. 17–18. We note that the

specification interchangeably refers to "base material," "base material solution," and "base solution," demonstrating that none of these terms is restricted to an embodiment in which the active particles are in a separate layer from the base material. *Compare* Ex. 1001, Fig. 1 (at step 110, using "***base solution***"; at step 130, demonstrating "Mix together active particles and ***base solution***"), *with id.* at 3:37 ("At step 110, a substantially liquid-impermeable cured ***base material solution*** is provided."), and *id.* at 6:65–7:1 ("At step 130, ***the base material solution*** and the active particles may be mixed together."); *see also* 2:23–25 ("In some embodiments, a breathable membrane includes a ***base material solution*** and active particles."); 7:5–7 ("In other embodiments, the active particles may be mixed with the ***base solution***"); 2:59–67 ("the active particles may be incorporated in a way that maintains [the properties] generally associated with the ***base material*** before having the active particles incorporated therein."); 4:39–43 ("after a process that incorporates the particles into a material (e.g., a ***base material***)"); 7:65–67 (discussing the "loading of each raw material (e.g., ***base material***, activated carbon, and protective substance)"); 10:14–18 ("in the present invention, it was found that incorporating active particles, such as for example activated carbon, into the ***base material*** increased the ability of the base materials to absorb IR light") (emphasis added). Thus, because the patent uses these terms essentially interchangeably, Patent Owner's argument that claim 1 and claim 27 disclose fundamentally different embodiments with different layer structures is unsupported by the language of the specification.

Moreover, nowhere does the specification equate "cured base material" with "substrate." Reply 6–7. We are not persuaded by Patent

Owner's arguments equating the two, because "substrate" in the '287 patent specification is a different structure to which a membrane made of base material and active particles may be applied. Ex. 1001, at [57] ("a breathable membrane includes a base material solution and active particles . . . [t]he membrane may be applied to a substrate, or may be used independent of a substrate"), Fig. 1 (Step 130: "Mix together active particles and base solution"; Step 140: "Apply mixture to a substrate"), 2:13–15 ("The membrane can be a self-supporting membrane or a coating on a substrate"). Additionally, 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, ¶ 60, Figs. 4, 5 (Haggquist, incorporated by reference in its entirety into the '287 patent, 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"). Because active particles can be mixed with the base material, it is difficult to envision how this intermixing leads to a material that requires two different layers.

Relatedly, the claim language of claim 50 also indicates that a two-layer construction is not required by claim 27, because, unlike claim 27, claim 50 expressly recites a cured base material solution that is adapted for application to a substrate. *See also* Ex. 1001, 14:9–13 (providing, in

claim 50, that the "substantially liquid-impermeable cured base material solution, plurality of active particles, and at least one removable encapsulant comprise a mixture, the mixture being adapted for application to a substrate prior to the substantially liquid-impermeable cured base material solution being cured"). If the cured base material of claim 27 were interpreted to be the substrate, that interpretation would be inconsistent with the language of claim 50, which separately provides for a substrate. Thus, 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.

In our Institution Decision, we construed "second thickness" to mean "the thickness of a plurality of active particles," which may be the particle size of the active particles. Dec. 13. We noted that the specification does not appear to define "second thickness," outside of using it in the claims, where its use following the use of the open-ended term "comprising"

indicates that the active particles may have other properties apart from a thickness. *Id.* We also noted that the applicant, during prosecution, equated "the second thickness" with the particle size of the active particles. *Id.* (citing Ex. 1007, 17).

Patent Owner argues that the proper construction of "second thickness" is a "second layer or membrane." PO Resp. 19. Patent Owner points to embodiments of the patent "that disclose placing a layer of active particles in contact with a base material (often using a solution or liquid suspension of active particles)." *Id.* (citing Ex. 1004 ¶¶ 67–68, 71–75, 78; Ex. 1004, claim 5, claim 11). Patent Owner maintains that the plurality of active particles, i.e. the layer with active particles, with or without a solvent, "forms a second layer which is the second thickness." *Id.* at 19–20. Regarding the existing construction of "particle size of active particles," Patent Owner argues that one of ordinary skill in the art would use "diameter" instead. *Id.* at 20 (citing Ex. 2005 ¶ 47). According to Patent Owner, one of ordinary skill in the art "does not need an express definition of 'second thickness' because it is readily apparent that the active particle *layer* has a physical thickness that can be measured." *Id.* at 22. Regarding the prosecution history, Patent Owner states that the much-discussed comments in the prosecution history (Ex. 1007, 17) "were an effort to identify support for a claim amendment, and nothing more." *Id.* at 21.

Petitioner contests Patent Owner's assertion that the "second thickness" is a "second layer or membrane" in contact with the first thickness (i.e. "first layer or membrane"). Reply 7. Petitioner again notes that the Patent Owner defined the first and second thicknesses during prosecution, defining "first thickness" as the thickness dimension of a

membrane (containing active particles) and the "second thickness" based on the size of the active particles. *Id.* at 7–8 (citing Ex. 1007, 17; Ex. 1044 ¶ 33). Petitioner further notes that claim 27 itself "is not limited to a two-layer waterproof composition advocated by [Patent Owner] and makes no mention of layers, much less a 'second layer' formed by a plurality of active particles." *Id.* at 8.

After considering the record developed during trial, we make the following findings. The specification does not appear to define "second thickness." The term "second thickness" is present in independent claims 1, 27, 40, and 45, which provide for: "a plurality of active particles in contact with the substantially liquid-impermeable cured base material solution" that "comprise a second thickness" (Claim 1); "a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness" (Claim 27); "a plurality of active particles in contact with the base material, the plurality of active particles comprising a second thickness" (Claims 40, 45); and dependent claims that further define the dimensions of the second thickness (Claims 55–62). 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. Dec. 13. During prosecution, the applicant equated "the second thickness" with the particle size of the active particles. Ex. 1007, 17 (discussing the "Example 1 membrane" as having "a thickness of about 1 mil, or about 25.4 microns (the first thickness) and . . . the activated carbon used in such a membrane comprises Asbury 5564 . . . [with a] particle size . . . [of] about 10 microns (the second thickness)"). This passage indicates that Patent Owner

connected numerical measurements to both a first thickness (25.4 microns) and a second thickness (10 microns). *Id.* In this case, the second thickness, 10 microns, is the particle size of Asbury 5564, a type of active particle. *Id.* We note that the second thickness identified here, 10 microns, corresponds to the "second thickness" of 10 microns in claims 59–62 of the '287 patent. Ex. 1001, 14:30–37.

We disagree with Patent Owner's suggestion that we should cast aside its prosecution history statement as "an effort to identify support for a claim amendment, and nothing more," because it is the primary example identified to us of what Patent Owner considers to be a "second thickness." PO Resp. 21; *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1317 (Fed. Cir. 2005) (en banc) ("[A] court should also consider the patent's prosecution history, if it is in evidence. . . . Like the specification, the prosecution history provides evidence of how the [Patent Office] and the inventor understood the patent." (citations and quotation marks omitted)).

As discussed above in connection with our construction of "first thickness," we disagree that the composition of claim 27 requires a two-layer construction. Thus, it is not required that the "second thickness" be the thickness of the membrane, i.e. the base material plus active particles, when applied to a substrate having a first thickness, as urged by Patent Owner. It appears from the record that the applicant did not discuss the second thickness in any great detail in the specification of the '287 patent. However, the applicant discussed the second thickness in the prosecution history, equating the second thickness with the thickness or particle size (10 microns) of a particular particle (Asbury 5564). Thus, 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. Level 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 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.

For the purposes of our Institution Decision, we accepted Petitioner's contentions regarding the level of ordinary skill in the art. Dec. 4–5. Patent Owner does not appear to dispute Petitioner's definition of one of ordinary skill in the art. *See generally* PO Resp. Neither party argues that the outcome of this case would differ based on our adoption of any particular definition of one of ordinary skill in the art. In light of the record now before us and consistent with the Institution Decision, we adopt Petitioner's definition of one of ordinary skill in the art. The level of ordinary skill in the art is also reflected by the references themselves. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) ("[T]he absence of specific findings on the level of skill in the art does not give rise to reversible error 'where the prior art itself reflects an appropriate level and a need for testimony is not

shown.'"); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (finding that the Board of Patent Appeals and Interferences did not err in concluding that the level of ordinary skill in the art was best determined by the references of record).

C. 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 9:18–22) 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, including identifying Sephadex G-200-50 particles in its Example 1B. *Id.* at 18:12–21. 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, [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 3:10–12. 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 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 diols, and any other suitable substances." *Id.* ¶ 33.

D. Analysis

To anticipate a claim under 35 U.S.C. § 102, "a single prior art reference must expressly or inherently disclose each claim limitation." *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). Accordingly, "the dispositive question regarding anticipation [i]s whether one skilled in the art would reasonably understand or infer from the [prior art reference's] teaching that every claim element was disclosed in that single reference." *Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time the invention was made. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). Obviousness is resolved based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). In that regard, an obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences

and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007).

Petitioner bears the burden of proving unpatentability of the challenged claims, and the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). Petitioner must demonstrate obviousness by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d); *see also Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). A party that petitions the Board for a determination of obviousness must show that "a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Procter & Gamble Co. v. Teva Pharm. USA, Inc.*, 566 F.3d 989, 994 (Fed. Cir. 2009) (quoting *Pfizer, Inc. v. Apotex, Inc.*, 408 F.3d 1348, 1361 (Fed. Cir. 2007)). We analyze both parties' arguments, below, in accordance with the above-stated principles.

i. 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).

a. Active Particles

Patent Owner contends, first, that the Petition fails to show how Dutta discloses "active particles." PO Resp. 26. Rather, Patent Owner argues,

Dutta discloses only "hydrophilic absorbent particles" such as hydrophilic absorbent Sephadex particles, and that "the core of the Dutta invention is the ability of the hydrophilic absorbent particles to *ab*sorb water." *Id.* at 26–27. Patent Owner disagrees with Petitioner's assertion "that the Sephadex particles used in Dutta are both absorbent *and* adsorbent 'capable of trapping water and other substances,'" arguing that one of ordinary skill in the art "would clearly understand that [absorption and adsorption] are diametrically opposed scientific pathways and principles." *Id.* at 28–29 (quoting Ex. 2006 ¶ 106).

Petitioner replies that Dutta's disclosure of Sephadex, which adsorbs or traps substances, meets the definition of active particles under the Board's construction. Reply 10. Petitioner presents evidence that Sephadex, in addition to being an absorbent particle, is also an adsorbent particle capable of trapping water and other substances. *Id.* at 10–11 (citing Ex. 1002, 18:10–21, 23:3–10; Ex. 1005 ¶¶ 117-125; Ex. 1023, 143, 1287; Ex. 1027, 7; Ex. 1044 ¶¶ 39–40; Ex. 1048, 157:5–8 (Patent Owner's expert admitting that Sephadex traps water)). Even under Patent Owner's proposed construction, Petitioner argues, Sephadex particles are porous and known molecular sieves that adsorb or trap water on their surface. *Id.* at 11 (citing Ex. 1001, 4:12–19; Ex. 1005 ¶ 122; Ex. 1023, 1287; Ex. 1027, 7; Ex. 1044 ¶¶ 41–42).

Petitioner presents persuasive 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). Petitioner's Reply reinforces its contentions that Sephadex is both adsorbent and absorbent. Reply 10–11. We are persuaded that Sephadex particles are porous and also molecular sieves that adsorb or trap water. *Id.*

at 11 (citing Ex. 1001, 4:12–19; Ex. 1005 ¶ 122; Ex. 1023, 1287; Ex. 1027, 7; Ex. 1044 ¶ 41 (restating the bases for Dr. Oelker's findings that Sephadex adsorbs or traps substances as well as acting as a molecular sieve)); *see also* Ex. 1044 ¶ 42 (stating the bases for Dr. Oelker's opinion that Sephadex particles qualify as active particles even under Patent Owner's proposed construction). On this record, and maintaining 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 and evidence that Sephadex particles are active particles.

b. First Thickness and Second Thickness

Patent Owner contends, next, that the Petition fails to show how Dutta discloses the "first thickness" and the "second thickness." PO Resp. 29. First, Patent Owner argues that the Petition fails to show how Dutta satisfies the construction of "first thickness" as adopted by the Board, because the Petition's citation to Dutta's Abstract "fails to specifically show how Dutta discloses the 'first thickness' under Petitioner's proposed construction." *Id.* at 30. Second, Patent Owner argues that "the Petition fails to show (or even allege) that Dutta discloses the two-layer invention of claim 27." *Id.* at 31. According to Patent Owner, "the first and second thicknesses are clearly distinct, with the plurality of active particle[s] comprising the second thickness"; the "Petition not only fails to treat them as distinct"; and the Petition "also fails to specifically show where Dutta discloses a second layer, distinct from the first, comprised of the 'plurality of active particles.'" *Id.* at 31–32.

Petitioner replies that Dutta discloses the "first thickness" and "second thickness" as presently construed by the Board, and moreover, "discloses a two-layer composition having a first thickness and a second thickness" under Patent Owner's narrow claim interpretation. Reply 13. Petitioner reiterates that the "challenged claims are not limited to a two-layer composition, nor is it necessary for *Dutta* to disclose distinct first and second layers." *Id*. at 14. Nonetheless, Petitioner argues, Dutta also discloses that "a layered arrangement of the polymer resin and the absorbent particles can be used to fabricate useful products." *Id*. (citing Ex. 1005 ¶ 65; Ex. 1002, 12:26–27, 4:20–28; Example 6).

As discussed above in connection with our construction of "first thickness" and "second thickness," 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"). As discussed above, the terms "first thickness" and "second thickness," when read in view of the specification and prosecution history, do not require two distinct layers. *Id.* Patent Owner, as far as we can discern, does not make any arguments that are not premised on its "two-layer" claim construction, which, in view of our determination that the claims do not require two distinct layers, further reinforces Petitioner's position.

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 film thickness of Example 1B (polyurethane with

Sephadex particles) to be 0.0030 inches, or 76.2 microns.[6] Ex. 1002, Table 1. 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, Petitioner's reliance on Example 1B of Dutta is sufficient to support its assertions that Dutta discloses the "first thickness" of claim 27.

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 separate layer, let alone a separate 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 material. *See, e.g.*, Ex. 1001, 2:24–25, 2:52–54, 8:55–57. Thus, Petitioner's reliance on the particle size of Dutta's particles is sufficient to support its assertions that Dutta discloses the "second thickness" of claim 27. Petitioner shows that Dutta Example 1B meets the

[6] Petitioner relies on Dutta's disclosed film thickness of 76.2 microns (0.0030 inches) to satisfy the thickness ratio limitation of claim 27. Pet. 35.

thickness ratio limitation of claim 27 for a portion of the particle size range disclosed in Dutta, namely for "particles sized from 20–30 microns within the 20–50 micron range." Pet. 35 (providing, as an example, that "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)").Patent Owner does not dispute this portion of Petitioner's analysis or assert criticality of the claimed range. *See* Tr. 15:6–8. We determine that the range of particle sizes in Dutta is sufficiently specific to meet the claimed ratio. *See Ineos USA LLC v Berry Plastics Corp.,* 783 F.3d 865, 869 (Fed. Cir. 2015) (stating that if the prior art discloses its own range the prior art is anticipatory "if it describes the claimed range with sufficient specificity such that a reasonable fact finder could conclude that there is no reasonable difference in how the invention operates over the ranges")).

In sum, we are persuaded 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 persuasive 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 shown by a preponderance of the evidence that the limitations of the challenged independent claim are disclosed by Dutta.

Petitioner also presents arguments, evidence, and a claim chart to support its assertions that Dutta anticipates challenged dependent claims 28, 30, 32, and 36–37. Pet. 21–31. More particularly, with respect to claims 28, 30, and 32, which require that the active particles comprise about 0–75%, 0–30%, and 0–50% of the total weight of the composition, respectively, Petitioner points to Dutta's Example 1B disclosure of 1.55 grams of Sephadex G-200-50 dispersed in a 36.8 grams of hydrophilic polyurethane solution, "which would result in a particle loading level of 4% by weight." *Id.* at 26–29. Regarding claim 36, which requires that the composition possess quick drying properties at least in part due to the active particles, Petitioner directs us to the improved WVTR (also known as MVTR) between Comparative Example 1 (with no particles) and Example 1B (with Sephadex particles) in Table 1 of Dutta. *Id.* at 29–30, 36–37 (citing Ex. 1002, 23:3–10; Ex. 1005 ¶ 118–126). Regarding claim 37, which requires that the active particles be selected from a group consisting of, *inter alia*, molecular filter-type materials, Petitioner points to Dutta's Example 1B, which discloses utilizing Sephadex particles, a known molecular filter-type material. *Id.* at 30–31, 37 (citing Ex. 1024, 1:66–68, Ex. 1002, 23:3–10; Ex. 1005 ¶ 137). We are persuaded by Petitioner's presentation of the evidence with respect to the challenged dependent claims, and Patent Owner does not specifically contest Petitioner's assertions with respect to claims 28, 30, 32, 36, and 37. In sum, on this record, we find that Petitioner has demonstrated by a preponderance of the evidence that Dutta anticipates dependent claims 28, 30, 32, 36, and 37, as well as independent claim 27.

ii. 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.* at 37–38 (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 1B. *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 particular improved MVTR of the claims. *Id.* at 40–41.

Petitioner provides a number of reasons to combine the references. *Id.* at 43. 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 fails "for at least the reasons given with respect to the failure of Ground 1." PO Resp. 32. Patent Owner also points out that there is "no evidence of record to show that when an activated particle is substituted in Dutta . . . that you get to the MVTR ranges that are in the original tables of Exhibit 1002." Tr. 59:13–15. Patent Owner maintains that the "last piece, the claimed MVTR range, with the active particles is simply absent from the record and, really, is absent from the argument presented to the Board here today." *Id.* at 59:23–25.

At oral hearing, when asked about the MVTR of the proposed combination, Petitioner stated that "those MVTR ranges are disclosed by Dutta . . . so the issue is when you switch out a different particle which is the same class of particles, they're particles that adsorb or trap substances, they're molecular filter particles, would there be a reasonable expectation of success?" Tr. 25:18–22. In its Opposition to Patent Owner's Motion to Exclude, Petitioner stated that the Petition and Dr. Oelker's first Declaration "also explain how the combination of references would have provided an MVTR within the claimed range with a reasonable expectation of success." Paper 44, 8 (citing Paper 1, 41–42; Ex. 1005 ¶¶ 156–158).

For this ground, Petitioner relies on the combination of Dutta and Haggquist to disclose the claimed water-proof composition, and more particularly, on a substitution of Haggquist's active particles for those of Dutta. Pet. 38 ("*Haggquist* discloses active particles that can be substituted for the Sephadex particles utilized in [Dutta] Example 1B."), 39 ("*Haggquist*

recites a plurality of active particles (Carbon) with a second thickness (diameter of less than 10 microns).”). Thus, the combination relied on here, and the arguments to support it, are distinct from the single embodiment in the Dutta reference and the arguments relied on by Petitioner in the previous anticipation ground based on Dutta alone.

Claim 27 requires that the 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, 12:14–16. To demonstrate that the combination meets this limitation, Petitioner’s claim chart relies on Table 1 of Dutta. Pet. 25–26. The claim chart, however, does not provide any reference to Haggquist for this limitation, despite Petitioner’s reliance on the combination of Haggquist’s particles with Dutta’s composition for this ground. The Petition also states: “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.” Pet. 41. Petitioner relies on Figure 2 of the ’287 patent to show that “carbon particles combined with polyurethane have MVTRs that range from 6,356 g/m^2/day to 10,385 g/m^2/day.” *Id.* (citing Ex. 1001, Fig. 2). The Petition, however, provides no other support for its assertion that the combination of Dutta and Haggquist would have an MVTR within the claimed range. Petitioner’s reliance on the ’287 patent’s Figure 2 is unpersuasive, as it is unclear, absent further explanation or evidence, that the conditions leading to the MVTRs in Figure 2 would be applicable to the combination of Dutta and Haggquist proposed by Petitioner.

Although we agree with Petitioner that "absolute predictability" is not the standard for "reasonable expectation of success" (Paper 44, 9), the question here is whether the proposed combination would reasonably have been expected to have a particular property (MVTR) required by the claims. Petitioner has not met its burden of proof in this regard. Petitioner provides no analysis showing that Haggquist's active particles, when substituted for the Sephadex particles of Dutta, would have reasonably been expected to result in a membrane having an MVTR within the claimed range. We cannot independently determine, from the evidence before us, what the expected MVTR of the combination would be, nor should Petitioner expect the Board to search the record and piece together the evidence that may support Petitioner's arguments. 35 U.S.C. § 312(a)(3) (a Petition is required to identify "with particularity[] the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge."); *DeSilva v. DiLeonardi*, 181 F.3d 865, 866–67 (7th Cir. 1999) ("A brief must make all arguments accessible to the judges, rather than ask them to play archeologist with the record."); 37 C.F.R. § 42.22(a)(2) (the "petition . . . must include . . . [a] full statement of the reasons for the relief requested").

On the full record now before us, Petitioner has not articulated or provide sufficient citations to evidence to support how the cited references teach or suggest each element of the challenged claims. Thus, for the reasons expressed herein, we determine that the obviousness ground based on Dutta and Haggquist is deficient. Because all the claims challenged under this ground depend, directly or indirectly, from claim 27, and because we determine that none of the remaining arguments relating to the dependent

claims cure the deficiency identified herein, we determine that Petitioner has not established by a preponderance of the evidence that claims 27, 28, 30, 32, and 35–39 would have been obvious over the combination of Dutta and Haggquist.

iii. 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, 10–200 microns, 70–140 microns, and 80–100 microns (*id.* at 50–51, 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, incorporated into the water-vapour-permeable polymer (*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 an MVTR in Table 3 upwards of 6924 g/m^2/day (*id.* at 52–53).

a. Active Particles

Patent Owner contends, first, that the Petition fails to show how Halley discloses "active particles" or "active particles [that] improve the moisture vapor transport capacity of the composition." PO Resp. 36. According to Patent Owner, "Halley does not disclose or discuss ***any*** activation of particles, surface-active particles, or adsorption," but rather, "involves hydrophilic matter (a hydrophilic coating) that operates solely by absorption and swelling, but with the addition of particulate solids added for strength and abrasion resistance." *Id.* at 36–37. Patent Owner argues that Halley discloses "carbon particles" that are incapable of being processed into activated carbon because its particles are too small. *Id.* at 37. Halley's examples using Black Pearls 2000 Carbon Black, Patent Owner argues, teach a hydrophilic film that "operates ***solely by absorption***." *Id.* at 38. Even if the carbon black added to Halley's membrane were activated carbon, which Patent Owner argues it is not, Halley's testing shows that the carbon black does not improve the water vapor transmission rate. *Id.* at 39 (citing Ex. 1002, 9:36–10:1; Ex. 2006 ¶ 101.

Petitioner replies that one of ordinary skill in the art would recognize that Halley's Black Pearls 2000 "are 'active particles' because they improve

MVTR when incorporated into a polymer coating." Reply 17 (citing Ex. 1044 ¶ 68). Petitioner also argues that, "while silent on the particular mechanism, *Halley* provides ample evidence that its particulate solids improve membrane MVTR." *Id.* at 18 (citing Ex. 1003, 8:6–10, 9:1–5; Ex. 1005 ¶¶ 195, 203, 211). Furthermore, argues Petitioner, Halley's Black Pearls 2000 "were known to adsorb water and, therefore, would be 'active particles' under" Patent Owner's claim interpretation. *Id.*

Petitioner presents persuasive 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 (citing Ex. 1003, 3:1–7), 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)). Petitioner's Reply reinforces its contentions that Halley's active particles are both adsorbent and absorbent. Reply 17–19. We are persuaded that Halley's active particles improve MVTR, and are therefore active. *Id.* at 18 (citing Ex. 1003, 8:6–10, 9:1–5; Ex. 1005 ¶¶ 195, 203, 211). We also are persuaded that Halley's Black Pearls 2000 are active particles that were known to adsorb water. *Id.* at 18–19 (citing Ex. 1044 ¶ 71 (restating the bases for Dr. Oelker's findings that Black Pearls 2000 adsorb or trap water, and that Black Pearls 2000 qualify as active particles even under Patent Owner's proposed construction). On this record, and maintaining 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 and evidence that Halley's particles are active particles.

b. First Thickness and Second Thickness

Patent Owner contends, next, that Halley does not disclose the "first thickness" and the "second thickness." PO Resp. 40. More particularly, Patent Owner contends that the Petitioner fails to "show how Halley discloses 'the thickness of the water-proof composition' or how the water-proof composition 'includes the base material and the active particles.'" *Id.* Patent Owner also argues that the Petition fails to "show how the 'first thickness' element, as properly construed, is met by Halley" and fails to "show (or even allege) that Halley discloses the two-layer invention of claim 27." *Id.* at 41. More particularly, Patent Owner contends that the citations to Halley relied on by Petitioner fail show a second layer, distinct from the first, comprised of the "plurality of active particles." *Id.*

Petitioner replies that, again, the claimed composition "need only *comprise* a cured base material having a first thickness and a plurality of active particles having a second thickness," and therefore, Halley meets this limitation with its films containing particulate solids such as Black Pearls 2000 cured into a membrane and optionally applied to a fabric substrate. Reply 19. The first thickness and the second thickness, Petitioner reiterates, are not required to be separate and distinct layers. *Id.* at 20.

As discussed above in connection with our construction of "first thickness" and "second thickness," 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"). As discussed above, the terms "first thickness" and "second thickness," when read in view of the specification and prosecution history, do not require two distinct layers. *Id.* Patent Owner, as far as we

can discern, does not make any arguments that are not premised on its "two-layer" claim construction, which, in view of our determination that the claims do not require a two distinct layers, further reinforces Petitioner's position.

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, 57. 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 discloses 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, Petitioner's reliance on this disclosure and on the general and specific disclosures of Halley's coating thickness is sufficient to support its assertions that Halley discloses the "first thickness" of claim 27.

Regarding the "second thickness," Petitioner relies on the thickness of Halley's primary particles, "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," 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 separate layer, let alone a separate 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 material. *See, e.g.*, Ex. 1001, 2:24–25, 2:52–54, 8:55–57. Thus, Petitioner's reliance on Halley's particle size or aggregate particle size is sufficient to support its assertions that Halley discloses the "second thickness" of claim 27. Petitioner also shows that, in Halley, the first thickness (5–100 microns; 10–200 microns; 70–140 microns; and 80–100 microns) (Ex. 1003, 5:5–22)) is at least 2.5 times larger than the 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) (Ex. 1003, 3:8–20)), but less than an order of magnitude (i.e. 10 times) larger than the second thickness. Pet. 58 (providing, as an example, that "a polymeric film thickness of 70–140 microns or 80–100 microns, which are two of the four disclosed ranges in *Halley*," meets 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."). *Id.* Patent Owner does not dispute this portion of Petitioner's analysis or assert criticality of the claimed range. *See* Tr. 15:6–8. We determine that the ranges of the aggregate particle sizes and film thicknesses in Halley are sufficiently specific to meet the claimed ratio. *See Ineos USA LLC v Berry*

Plastics Corp., 783 F.3d at 869 (stating that if the prior art discloses its own range the prior art is anticipatory "if it describes the claimed range with sufficient specificity such that a reasonable fact finder could conclude that there is no reasonable difference in how the invention operates over the ranges")).

In sum, we are persuaded 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 persuasive 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 shown by a preponderance of the evidence that the limitations of the challenged independent claim are disclosed by Halley.

Petitioner also presents arguments, evidence, and a claim chart to support its assertions that Halley anticipates challenged dependent claims 28, 30, 32, 33, and 35–37. Pet. 53–60. More particularly, with respect to claims 28, 30, and 32, which require that the active particles comprise about 0–75%, 0–30%, and 0–50% of the total weight of the composition, respectively, Petitioner points to Halley's Table 3 disclosure "utilizing 0.3%, 0.65 %, and 1.5 % carbon particles relative to the total weight of the composition." *Id.* at 53–54. Regarding claim 33, which

requires that the composition possess anti-static properties at least in part due to the active particles, Petitioner relies on Halley's statement that when the particulate solid is carbon, "the material exhibits electrical conductivity at surprisingly low carbon contents," which is "valuable in providing a material having antistatic properties." *Id.* at 54–55 (citing Ex. 1003, 3:31–34, 5:27–29). Regarding claim 35, which requires that the composition possess odor absorbance properties at least in part due to the active particles, Petitioner relies on Halley's use of carbon particles as well as titanium dioxide, zinc oxide, iron oxide, aluminum oxide, silica, talc, mica, tin, or silver. *Id.* at 55 (citing Ex. 1003, 3:1–7), 59 (citing Ex. 1005 ¶ 216 (explaining that an odor absorbing composition may include particles or activated carbon, aluminum oxide, silica gel, and titanium dioxide)). Regarding claim 36, which requires that the composition possess quick drying properties at least in part due to the active particles, Petitioner directs us to the improved MVTR between the Control (with no particles) and Samples 1–3 (with added carbon particles, namely, Black Pearls 2000 Carbon Black) in Table 3 of Halley. *Id.* at 55–56, 59–60 (citing Ex. 1003, 9:1–5; Ex. 1005 ¶ 217). Regarding claim 37, which requires that the active particles be selected from a group consisting of, *inter alia*, activated carbon, Petitioner points to Halley's disclosure that a preferred particulate solid is carbon particles. *Id.* at 56 (citing Ex. 1003, 3:1–7). We are persuaded by Petitioner's presentation of the evidence with respect to the challenged dependent claims, and Patent Owner does not specifically contest Petitioner's assertions with respect to claims 28, 30, 32, 33, and 35–37. In sum, on this record, we find that Petitioner has demonstrated by a

preponderance of the evidence that Halley anticipates dependent claims 28, 30, 32, 33, and 35–37 as well as independent claim 27.

iv. 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. *Id.* at 62–64. 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 fails "for at least the reasons given with respect to the denial of Ground 3." PO Resp. 42. Patent Owner also points out that there is "no evidence of record to show that when an activated particle is substituted . . . in Halley that you get to the MVTR ranges that are in the original tables of Exhibit . . . 1003." Tr. 59:13–15. Patent Owner maintains that the "last piece, the claimed MVTR range, with the active particles is simply absent from the record and, really, is absent from the argument presented to the Board here today." *Id.* at 59:23–25.

At oral hearing, when asked about the MVTR of the proposed combination, Petitioner stated that "those MVTR ranges are disclosed by . . . Halley so the issue is when you switch out a different particle which is the same class of particles, they're particles that adsorb or trap substances,

they're molecular filter particles, would there be a reasonable expectation of success?" Tr. 25:18–22. In its Opposition to Patent Owner's Motion to Exclude, Petitioner stated that the Petition and Dr. Oelker's first Declaration "also explain how the combination of references would have provided an MVTR within the claimed range with a reasonable expectation of success." Paper 44, 8 (citing Paper 1, 41–42; Ex. 1005 ¶¶ 156–158).

For this ground, Petitioner relies on the combination of Halley and Haggquist to disclose the composition of claims 38 and 39. More particularly, for claim 27, upon which both claims 38 and 39 rely, Petitioner relies on Table 3 of Halley to disclose the MVTR of the water-proof composition. Pet. 52–53 (citing Ex. 1003, 9:1–5). Table 3 reports the MVTR of the Control and Samples 1–3, which were created using a particular fine carbon (Black Pearls 2000 Carbon Black). Ex. 1003, 7:17–20. Although Haggquist discloses, generally, that its encapsulants may be used on a variety of particles, we are not directed to any portion of Haggquist that discloses any MVTR ranges for any of its compositions. *See, e.g.*, Pet. 52–53, 60–65. Thus, the combination relied on here, and the arguments to support it, are distinct from the single embodiment in the Halley reference and the arguments relied on by Petitioner in the previous anticipation ground based on Halley alone.

Claim 27, from which challenged claims 38 and 39 depend, requires that the 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, 12:14–16. To demonstrate that the combination meets this limitation, Petitioner's claim chart for claims 38 and 39 refers back to claim 27, for which the claim chart relies on Table 3 of Halley. Pet. 53, 60–61. Table 3

of Halley is specific to a particular experimental embodiment in Halley, which uses Black Pearls 2000 as the active particle. The Petition is silent as to whether encapsulating Halley's Black Pearls 2000 with Haggquist's encapsulants retains the MVTR required in claim 27, which is also required by dependent claims 38 and 39. Rather, it is unclear that the conditions leading to the MVTRs in Table 3 of Halley would be applicable to the combination of Halley and Haggquist proposed by Petitioner. Haggquist states: "When the removable substance is applied to the active particle, it encapsulates at least a portion of the active particle. Thus, an encapsulated particle is an active particle existing in a deactivated state . . . ." Ex. 1004 ¶ 15. Claim 38 requires a removable encapsulant applied to at least a substantial portion of the active particles, and provides that 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." Ex. 1001, 12:52–59. On the record before us, it is unclear how an active particle existing in a deactivated state, whether comprising a portion or more of the active particles of the composition, would contribute to the MVTR of the overall composition, or lead to the MVTR rates required by claim 27.

Petitioner has not met its burden of proof to demonstrate that the proposed combination retains the claim 27 MVTR requirement, despite (or because of) its encapsulation by the Haggquist composition. Petitioner provides no analysis showing that Haggquist's encapsulation, when effected on the active particles of Halley, would have reasonably been expected to result in a membrane having an MVTR within the claimed range. We cannot independently determine, from the evidence before us, what the

expected MVTR of the combination would be, nor should Petitioner expect the Board to search the record and piece together the evidence that may support Petitioner's arguments. 35 U.S.C. § 312(a)(3) (a Petition is required to identify "with particularity[] the grounds on which the challenge to each claim is based, and the evidence that supports the grounds for the challenge."); *DeSilva*, 181 F.3d at 866–67 ("A brief must make all arguments accessible to the judges, rather than ask them to play archeologist with the record."); 37 C.F.R. § 42.22(a)(2) (the "petition . . . must include . . . [a] full statement of the reasons for the relief requested").

On the full record now before us, Petitioner has not articulated or provide sufficient citations to evidence to support how the cited references teach or suggest each element of the challenged claims. Thus, for the reasons expressed herein, we determine that the obviousness ground based on Halley and Haggquist is deficient. Because the claims challenged under this ground depend, directly or indirectly, from claim 27, and because we determine that none of the remaining arguments relating to the dependent claims cure the deficiency identified herein, we determine that Petitioner has not established by a preponderance of the evidence that claims 38 and 39 would have been obvious over the combination of Halley and Haggquist.

III. MOTION TO EXCLUDE

Patent Owner moves to exclude (1) Exhibit 1044 (Second Declaration of Dr. Abigail Oelker) on the grounds of improper incorporation by reference of other exhibits, improper new evidence that could have been presented in a prior filing, improper supplemental information, lack of authentication, inadmissible hearsay, improper legal conclusions, improper evidence not directly responsive to Patent Owner's evidence, improper

speculative and conclusory expert opinions, and lacking foundation; (2) Exhibit 1049–1058 on the grounds of improper new evidence that could have been presented in a prior filing, improper supplemental information, lacking authentication, inadmissible hearsay, improper evidence not directly responsive to Patent Owner's evidence, and irrelevant; and (3) Exhibit 1059 on the grounds that the declarant lacks personal knowledge and lacks foundation. Paper 42, 1–2. Petitioner filed an Opposition. Paper 44. Patent Owner filed a Reply. Paper 46.

With regard to (1) Exhibit 1044 (Second Declaration of Dr. Abigail Oelker), we have considered the arguments presented by both parties, and are not persuaded that Dr. Oelker's Second Declaration should be excluded. Patent Owner's arguments appear directed to the weight to be given to the paragraphs and argument sought to be excluded, rather than to their admissibility. We have accorded proper weight to the declarant's testimony as we have made our determinations in this case. Moreover, having reviewed the declaration, and having considered the arguments presented by both parties, we are not persuaded that the arguments and evidence in Exhibit 1044 or in the Reply exceed the scope of a proper reply; rather, they are properly responsive to Patent Owner's arguments and evidence and may be considered as part of our evaluation of the record.

With regard to (2) Exhibit 1049–1058, Petitioner's response is persuasive. Paper 44, 9–16. Patent Owner fails to articulate sufficiently why these documents should be excluded. Even if Exhibits 1049–1058 are inadmissible, and Dr. Oelker relies on 1049–1058, Fed. R. Evid. 703 allows for such reliance. *See* Fed. R. Evid. 703 ("If experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion

on the subject, they need not be admissible for the opinion to be admitted. But if the facts or data would otherwise be inadmissible, the proponent of the opinion may disclose them to the jury only if their probative value in helping the jury evaluate the opinion substantially outweighs their prejudicial effect."). Moreover, we do not affirmatively rely upon Exhibits 1049–1058 in our present determination. Therefore, we need not decide and, therefore, dismiss as moot Patent Owner's Motion to Exclude with respect to Exhibits 1049–1058.

Regarding (3) Exhibit 1059, we do not affirmatively rely upon Exhibit 1059 in our present determination. Therefore, we need not decide and, thus, dismiss as moot Patent Owner's Motion to Exclude with respect to Exhibit 1059.

We decline to exclude any of the evidence sought to be excluded and, instead, we give the evidence more or less persuasive value depending on the degree to which the testimony is supported by reasoning, fact, and Dr. Oelker's expertise.

Accordingly, the Motion to Exclude is *denied* as to Exhibit 1044 and *dismissed* as to Exhibits 1048–1059.

IV. CONCLUSION

We conclude that Petitioner has satisfied its burden of demonstrating, by a preponderance of the evidence, that the subject matter of claims 27, 28, 30, 32, 33, and 35–37 of the '287 patent is unpatentable. Petitioner, however, has not satisfied its burden of demonstrating, by a preponderance of the evidence, that the subject matter of claims 38 and 39 of the '287 patent is unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes, by a preponderance of the evidence, that claims 27, 28, 30, 32, 33, and 35–37 of U.S. Patent No. 8,945,287 B2 are unpatentable; and

FURTHER ORDERED that Petitioner fails to establish, by a preponderance of the evidence, that claims 38 and 39 of U.S. Patent No. 8,945,287 B2 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude is *denied* as to Exhibit 1044 and *dismissed* as to Exhibits 1048–1059; and

FURTHER ORDERED that this is a Final Written Decision; therefore, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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