United States Court of Appeals for the Federal Circuit

GUANGDONG ALISON HI-TECH CO.,
Appellant

v.

INTERNATIONAL TRADE COMMISSION,
Appellee

ASPEN AEROGELS, INC.,
Intervenor

2018-2042

Appeal from the United States International Trade Commission in Investigation No. 337-TA-1003.

Decided: August 27, 2019

JONATHAN WEINBERG, King & Spalding LLP, Washington, DC, argued for appellant. Also represented by PAUL WHITFIELD HUGHES, McDermott, Will & Emery LLP, Washington, DC; GARY HNATH, BRYAN NESE, Mayer Brown LLP, Washington, DC.

CATHY CHEN, Office of the General Counsel, United States International Trade Commission, Washington, DC, argued for appellee. Also represented by DOMINIC L. BIANCHI, WAYNE W. HERRINGTON.

PROSHANTO MUKHERJI, Fish & Richardson, PC, Boston, MA, argued for intervenor. Also represented by FRANK SCHERKENBACH, KURT LOUIS GLITZENSTEIN, ANDREW PEARSON, KEVIN SU; POONGUNRAN MUTHUKUMARAN, Aspen Aerogels, Inc., Northborough, MA.

Before WALLACH, HUGHES, and STOLL, *Circuit Judges.*

STOLL*, Circuit Judge.*

Guangdong Alison Hi-Tech Co. is a foreign manufacturer of aerogel insulation products currently subject to a limited exclusion order entered by the U.S. International Trade Commission following an unfair competition investigation. The exclusion order is based in part on the Commission's final determination that Alison's products infringe U.S. Patent No. 7,078,359, owned by domestic manufacturer Aspen Aerogels, Inc. Alison appeals the Commission's final determination that certain claims of the '359 patent are not indefinite based on their use of the term "lofty . . . batting." Alison also challenges the Commission's final determination that certain claims of the '359 patent are not invalid on anticipation and obviousness grounds. Because the written description of the '359 patent informs the meaning of "lofty . . . batting" with reasonable certainty, we affirm the Commission on the indefiniteness ground. And because we conclude that the Commission's factual findings are supported by substantial evidence, we also affirm the Commission on the anticipation ground without reaching the subsidiary obviousness ground.

BACKGROUND

Aspen filed a complaint with the Commission in 2016 alleging that Alison had violated section 337 of the Tariff Act of 1930, 19 U.S.C. § 1337, by importing certain composite aerogel insulation materials that infringe several of its patents, including the '359 patent. In September 2017, the

administrative law judge held that Alison had violated section 337 based, in relevant part, on her determination that certain claims of the '359 patent were not invalid and were infringed by Alison's importation of the accused products. In February 2018, the Commission affirmed the ALJ's initial determination. Relevant here, the Commission held that claims 1, 7, and 9 of the '359 patent were not invalid and were infringed by Alison. The Commission entered a limited exclusion order barring importation of Alison's infringing composite aerogel insulation materials.

I

The '359 patent, titled "Aerogel Composite with Fibrous Batting," is directed to an improvement in aerogel composite products. '359 patent col. 3 ll. 19–23. Aerogels, first created in the 1930s, are very light materials with excellent insulating properties. To form an aerogel, the liquid component of a gel is replaced with a gas via a specialized drying process that extracts the liquid while keeping the remaining components of the gel intact. The resulting product is highly porous and has low density, but is also very fragile and brittle. To improve flexibility, aerogels can be combined with fibrous materials to form an aerogel composite. The mechanical properties of the resulting composite will vary depending on the fibrous materials used and how they are combined.

The '359 patent specifically discloses an aerogel composite that uses a "lofty fibrous structure," or "lofty batting," as the fibrous material. *Id.* at col. 3 ll. 19–30. The '359 patent defines "lofty batting" as "a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)." *Id.* at col. 7 ll. 1–3. According to the '359 patent, the lofty batting reinforces the aerogel in a way that maintains or improves the thermal properties of the aerogel while providing a "highly flexible, drapeable form." *Id.* at col. 3 ll. 30–40. The '359 patent represents this as an improvement over prior aerogel composites,

which suffer from low flexibility, low durability, and degraded thermal performance. *See id.* at col. 1 l. 62–col. 3 l. 6.

Independent claim 1 and dependent claims 7 and 9 of the '359 patent are at issue on appeal. They recite:

> 1. A composite article to serve as a flexible, durable, light-weight insulation product, said article comprising a *lofty* fibrous *batting* sheet and a continuous aerogel through said batting.
>
> 7. The composite article of claim 1, further comprising a dopant.
>
> 9. The composite article of claim 7, wherein the dopant is present in an amount of about 1 to 20% by weight of the total weight of the composite.

Id. at col. 14 ll. 36–39, 63–64, col. 15 ll. 3–5 (emphases added to disputed claim term).

II

During claim construction proceedings before the ALJ, Alison argued that the claim phrase "lofty . . . batting" is indefinite. The ALJ rejected Alison's indefiniteness argument and adopted the '359 patent's express definition of "lofty . . . batting" as "[a] fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)." *Certain Composite Aerogel Insulation Materials & Methods for Mfg. the Same*, Inv. No. 337-TA-1003, Order No. 35, EDIS No. 602687, App. A at 4–6 (Jan. 31, 2017) (*Claim Construction Order*). In doing so, the ALJ emphasized that the "bulk" and "resilience" components of the "lofty . . . batting" definition are further explained in the specification. *Id.* at 4. In particular, the ALJ pointed to the specification's disclosure that bulk is "air" and that a lofty batting is "sufficiently resilient" if "after compression for a few seconds it will return to at least 70% of its original thickness." *Id.* (quoting '359 patent col. 7 ll. 45–

47, 49). Yet, in construing the term, the ALJ also declined Aspen's invitation to limit "lofty . . . batting" to that example in the specification: a material that is "compressible by at least 50% of its natural thickness and is sufficiently resilient that after compression for a few seconds it will return to at least 70% of its original thickness." *Id.* at 4–5; *see also* '359 patent col. 7 ll. 40–48. Alison petitioned the Commission for review of the ALJ's initial determination. The Commission affirmed the ALJ's construction and declined to review the ALJ's determination regarding indefiniteness. Thus, the Commission incorporated the ALJ's indefiniteness holding into its final determination without modification or further comment.

III

In the proceedings before the ALJ, Alison also challenged the validity of the asserted claims of the '359 patent in view of U.S. Patent No. 5,306,555 ("Ramamurthi"). Titled "Aerogel Matrix Composites," Ramamurthi discloses methods of manufacturing various aerogel matrix composites that incorporate fibers. *See* Ramamurthi col. 3 l. 53–col. 4 l. 38. The specification describes a series of example composites with varying characteristics. *See, e.g.*, *id.* at col. 6 l. 50–col. 9 l. 58 (Example 1-A).

The '359 patent specification acknowledges Ramamurthi as prior art and expressly distinguishes Ramamurthi's composites as having a high elastic modulus (i.e., being very stiff) and a relatively high thermal conductivity as compared with the composites disclosed in the '359 patent. '359 patent col. 1 l. 62–col. 2 l. 21. During prosecution of the '359 patent, the examiner considered Ramamurthi and ultimately allowed the claims over Ramamurthi based on the "lofty . . . batting" limitation. Alison cited Ramamurthi in a petition for inter partes review of the '359 patent, but the Patent Trial and Appeal Board denied institution, holding that Alison had not shown that Ramamurthi discloses a "lofty fibrous batting sheet."

Guangdong Alison Hi-Tech Co. v. Aspen Aerogels, Inc., No. IPR2017-00413, 2017 WL 2485089, at *4 (P.T.A.B. June 8, 2017).

In view of this evidence, along with testimony from the parties' experts, the ALJ rejected Alison's anticipation and obviousness challenges based on Ramamurthi. The Commission affirmed the ALJ's determination with only slight modifications not at issue here.

DISCUSSION

On appeal, Alison challenges the Commission's indefiniteness, anticipation, and obviousness determinations. We have jurisdiction under 28 U.S.C. § 1295(a)(6). We review the Commission's final determinations under the standards of the Administrative Procedure Act. *Ajinomoto Co. v. Int'l Trade Comm'n*, 597 F.3d 1267, 1272 (Fed. Cir. 2010) (citing 19 U.S.C. § 1337(c)). We review the Commission's factual findings for substantial evidence and its legal determinations de novo. *Id.* (citing 5 U.S.C. § 706(2)).

A finding is supported by substantial evidence if a "'reasonable mind might accept' a particular evidentiary record as 'adequate to support a conclusion.'" *Dickinson v. Zurko*, 527 U.S. 150, 162 (1999) (quoting *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938)). Substantial evidence must be sufficient "to justify, if the trial were to a jury, a refusal to direct a verdict when the conclusion sought to be drawn from it is one of fact for the jury." *Norgren Inc. v. Int'l Trade Comm'n*, 699 F.3d 1317, 1321 (Fed. Cir. 2012) (quoting *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951)). Thus, "[s]ubstantial evidence is not a fixed quantum of evidence," and "may only be determined with respect to the burden of proof that the litigant bore" in the trial proceedings. *Eli Lilly & Co. v. Aradigm Corp.*, 376 F.3d 1352, 1363 (Fed. Cir. 2004). Substantial evidence must also "take into account whatever in the record fairly detracts from its weight." *Jacobs v. Dep't of*

Justice, 35 F.3d 1543, 1546 (Fed. Cir. 1994) (quoting *Universal Camera*, 340 U.S. at 488).

Because patents are presumed valid, 35 U.S.C. § 282, a challenger at the ITC must prove invalidity by clear and convincing evidence, *One-E-Way, Inc. v. Int'l Trade Comm'n*, 859 F.3d 1059, 1062 (Fed. Cir. 2017). Accordingly, we review the factual findings underlying the Commission's invalidity determinations for "substantial evidence" by ascertaining whether those findings "were established by evidence that a reasonable person might find clear and convincing," and whether those findings "form an adequate predicate for the legal determination of invalidity." *Checkpoint Sys., Inc. v. U.S. Int'l Trade Comm'n*, 54 F.3d 756, 761 n.5 (Fed. Cir. 1995).

I

We first address the ALJ's initial determination that the challenged claims are not indefinite, a decision that the Commission declined to review. In her claim construction order, the ALJ specifically held that the phrase "lofty . . . batting," as used in the challenged claims of the '359 patent, is not indefinite in view of certain disclosures in the specification. For the reasons that follow, we agree, and accordingly, we affirm.

A

A patent's specification must "conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2 (2006).[1] This statutory

[1] Because the '359 patent does not contain any claim with an effective filing date on or after September 16, 2012, the applicable version of 35 U.S.C. § 112 is the one preceding the changes made by the America Invents Act. *See*

provision requires that "a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). Indefiniteness is a question of law that we review de novo, subject to a determination of underlying facts, which we review for substantial evidence. *One-E-Way*, 859 F.3d at 1062; *Osram GmbH v. Int'l Trade Comm'n*, 505 F.3d 1351, 1355 (Fed. Cir. 2007).

The "reasonable certainty" standard established in *Nautilus* reflects a "delicate balance" between "the inherent limitations of language" and providing "clear notice of what is claimed." 572 U.S. at 909 (first quoting *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002)). It "mandates clarity, while recognizing that absolute precision is unattainable." *Id.* at 910. It also accommodates the fact that "[s]ome modicum of uncertainty . . . is the 'price of ensuring the appropriate incentives for innovation.'" *Id.* at 909 (quoting *Festo*, 535 U.S. at 732). Consistent with these principles, we have explained that "a patentee need not define his invention with mathematical precision in order to comply with the definiteness requirement." *Sonix Tech. Co. v. Publ'ns Int'l, Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017) (quoting *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1384 (Fed. Cir. 2005)). Instead, "[t]he degree of precision necessary for adequate claims is a function of the nature of the subject matter." *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1382 (Fed. Cir. 2015) (alteration in original) (quoting *Miles Labs., Inc. v. Shandon, Inc.*, 997 F.2d 870, 875 (Fed. Cir. 1993)). Indeed, "[d]escriptive words like 'copious' are commonly used in patent claims, to 'avoid[ ] a strict numerical boundary to the specified parameter.'"

Leahy-Smith America Invents Act, Pub. L. No. 112-29 § 4(e), 125 Stat. 284, 297 (2011).

Braintree Labs., Inc. v. Novel Labs., Inc., 749 F.3d 1349, 1360 (Fed. Cir. 2014) (second alteration in original) (quoting *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1217 (Fed. Cir. 1995)).

To be sure, patents with claims involving terms of degree "must provide objective boundaries for those of skill in the art" in the context of the invention. *One-E-Way*, 859 F.3d at 1068 (quoting *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014)). Intrinsic evidence—such as the claims, figures, written description, or prosecution history of a patent—can provide the necessary objective boundaries. *See, e.g.*, *id.* at 1064–67 (ruling that consistent use of a disputed term in the claims, specification, and prosecution history informed claim scope); *Sonix*, 844 F.3d at 1378–79 (ruling that specific examples in the written description provided "points of comparison" informing claim scope); *Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332–36 (Fed. Cir. 2010) (ruling that dependent claims, examples, criteria, and test results in specification and prosecution history informed claim scope).[2] Extrinsic evidence can also help identify objective boundaries. *See, e.g.*, *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1368 (Fed. Cir. 2017) (considering expert testimony); *Sonix*, 844 F.3d at 1380 (considering expert testimony and prior litigation positions regarding meaning of disputed term); *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1260–61 (Fed. Cir. 2014) (considering advertising for prior art system).

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[2] Although *Enzo* was decided before the introduction of the "reasonable certainty" standard, we have repeatedly cited it in our post-*Nautilus* decisions. *See, e.g.*, *Sonix*, 844 F.3d at 1376–79; *Interval Licensing*, 766 F.3d at 1373.

B

On appeal, Alison challenges the Commission's determination that claims 1, 7, and 9 of the '359 patent are not indefinite. Alison argues that the challenged claims are invalid because "lofty . . . batting" is an indefinite term of degree without a precise boundary. While we agree that "lofty . . . batting" is a term of degree, Alison seeks a level of "mathematical precision" beyond what the law requires. *Sonix*, 844 F.3d at 1377. For the reasons that follow, we hold that the challenged claims are not indefinite because the written description of the '359 patent provides objective boundaries for the claim term "lofty . . . batting."

To start, the written description of the '359 patent provides express definitions for the phrase "lofty . . . batting" and its components. According to the '359 patent, a "batting" is commonly understood to be "a fibrous material commonly used for lining quilts or for stuffing or packaging or as a blanket of thermal insulation." '359 patent col. 7 ll. 21–23. A "*lofty* batting" is expressly defined as "a fibrous material that shows the properties of *bulk* and *some resilience* (with or without full bulk recovery)." *Id.* at col. 7 ll. 1–3 (emphases added). The specification explains that "bulk" refers to the air or openness created by the web of fibers in a lofty batting. *Id.* at col. 7 ll. 48–50, col. 8 ll. 8–13. It further explains that a batting is "sufficiently resilient" if it "can be compressed to remove the air (bulk) yet spring back to substantially its original size and shape." *Id.* at col. 7 ll. 40–50. A batting is also "lofty" if it "contains sufficiently few individual filaments (or fibers) [such] that it does not significantly alter the thermal properties of the reinforced composite as compared to a non-reinforced aerogel body of the same material." *Id.* at col. 7 ll. 28–32.

The '359 patent also details the functional characteristics of a "lofty . . . batting." The written description explains that using a lofty batting as reinforcement in an aerogel composite "minimizes the volume of unsupported

aerogel while avoiding substantial degradation of the thermal performance of the aerogel." *Id.* at col. 7 ll. 4–7. Because "highly aligned (straight) fibers" in the x-y horizontal plane can make the resulting composite stiff, the '359 patent explains that it is better to have the reinforcing fibers run along all three axes. *Id.* at col. 8 ll. 13–16. But because heat is typically transferred via fibers running along the z-axis, a suitably lofty batting must have "a high enough quantity of fibers oriented along the z axis to maintain loft, yet not so great a quantity that the insulating properties of the resulting composite are compromised by these fibers." *Id.* at col. 8 ll. 16–23. The specification thus distinguishes a lofty batting from the "fibrous mat" of the prior art—i.e., a "densely woven or thickly tangled mass" that has minimal open space, a higher density, and lacks the resilience of a lofty batting. *Id.* at col. 7 l. 60–col. 8 l. 5.

The written description of the '359 patent is replete with examples and metrics that further inform the meaning of "lofty . . . batting." It identifies specific examples of commercial products that can qualify as a lofty batting, including "Primaloft" (*id.* at col. 7 ll. 15–20), "Holofil" (*id.* at col. 7 ll. 50–56), "Thinsulate Lite Loft" (*id.* at col. 11 ll. 30–32), and "Quartzel" (*id.* at col. 12 ll. 6–9). It includes a list of nearly twenty "particularly suitable" fibrous materials for forming lofty batting, including commercial products like "Nomex," "Kevlar," "Spectra," and "Kynol." *Id.* at col. 9 ll. 25–40. It provides metrics for the fineness of fibers (*id.* at col. 7 ll. 23–25), the cross-sectional area of the fibers (*id.* at col. 7 ll. 32–36), the thermal conductivity of the batting (*id.* at col. 7 ll. 36–39), the compressibility and resilience of the batting (*id.* at col. 7 ll. 42–59), and the density of the batting (*id.* at col. 7 l. 64–col. 8 l. 1). The written description of the '359 patent concludes with a detailed discussion of seven examples of aerogel composites manufactured in accordance with the claimed invention, along with corresponding test results. *See id.* at col. 11 l. 21–col. 14 l. 34 (Examples 1–7).

Because "the written description is *key* to determining whether a term of degree is indefinite," *Sonix*, 844 F.3d at 1378 (emphasis added), we conclude that the evidence above is sufficient to dispose of this issue. But we note that the prosecution history also supports our conclusion. In the Statement of Reasons for Allowance, the patent examiner emphasized that the specification defined "lofty fibrous batting" as "a fibrous material that shows the properties of bulk and some resilience (with or without full bulk recovery)" and distinguished the prior art based on this term. J.A. 13203. Similarly, in its decision denying institution of IPR, the Board noted that "both parties agree that ["lofty fibrous batting"] indicates a fibrous material with both bulk and 'resilience,' which is the ability to regain at least some portion of its original shape and size after being compressed." *Alison*, 2017 WL 2485089, at *3.

The extrinsic evidence provides further support for the objective boundaries of "lofty . . . batting." A technical dictionary confirms that "batting" and "loft" are terms of art that have meanings consistent with their use in the '359 patent. *See* J.A. 12520–24. Before the Commission, both parties' experts could explain the meaning of "bulk" and "some resilience," the two defining characteristics of a "lofty . . . batting." While not dispositive, the application of these terms by the parties' experts, along with the examiner and Board at the Patent Office, further supports our conclusion that the challenged claim term is not indefinite. *See Sonix*, 844 F.3d at 1380 ("Although . . . application by the examiner and an expert do not, on their own, establish an objective standard, they nevertheless provide evidence that a skilled artisan did understand the scope of this invention with reasonable certainty.").

In sum, the written description of the '359 patent provides sufficient detail to inform a person of ordinary skill in the art about the meaning of "lofty . . . batting." That puts this case in the same class as cases like *Sonix* and *Enzo*, where we held that examples and procedures in the

written description provided sufficient guidance and points of comparison to render claim terms not indefinite. *See Sonix*, 844 F.3d at 1376–81; *Enzo*, 599 F.3d at 1332–36. We therefore conclude that claims 1, 7, and 9 are not indefinite because the '359 patent informs a person of ordinary skill in the art about the scope of "lofty . . . batting" with "reasonable certainty." *Nautilus*, 572 U.S. at 901.

Alison advances several arguments in support of its indefiniteness challenge, but we do not find them persuasive. First, Alison argues that "lofty . . . batting" is indefinite because the '359 patent provides no objective boundary between "some resilience," which would infringe, and "little [to no] resilience," which would not. Appellant's Br. 27–29; *see also* '359 patent col. 8 ll. 1–2 (fibrous mats "show little to no resilience").[3] In other words, in Alison's view, the '359 patent fails to disclose precisely how much resilience is enough to satisfy the claim. With this argument, Alison seeks a level of numerical precision beyond that required when using a term of degree. *See Enzo*, 599 F.3d at 1335; *see also Nautilus*, 572 U.S. at 909 ("Some modicum of uncertainty . . . is the 'price of ensuring the appropriate incentives for innovation.'" (quoting *Festo*, 535 U.S. at 732)). Because "[t]he degree of precision necessary . . . is a function of the nature of the subject matter," *Biosig*, 783 F.3d at 1382 (first alteration in original) (quoting *Miles*, 997 F.2d at 875), we agree with Aspen that a person of ordinary skill in this field "can tell when a material has zero or a negligible amount of resilience without needing a mathematical definition." Intervenor's Br. 24.

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[3] The Commission and Aspen contend that Alison waived this argument, but we disagree. *See* J.A. 12189 ("[T]he intrinsic record fails to specify how to demarcate the line between a fibrous material that has 'some resilience' and one that does not.").

Next, Alison argues that "lofty . . . batting" is indefinite because the '359 patent offers two independent ways to assess loftiness, without indicating which approach to use. According to Alison, the '359 patent provides a "thermal properties" approach at column 7, lines 28–36, and a "compressibility and resilience" approach at column 7, lines 40–48. Alison contends that the existence of two approaches makes this case like *Dow Chemical Co. v. Nova Chemicals Corp. (Canada)* and *Teva Pharmaceuticals USA, Inc. v. Sandoz, Inc.*, in which we held certain claims indefinite because there were competing ways to measure the limitation at issue, and the patents did not specify which measure to use. *See Dow Chem.*, 803 F.3d 620, 631–35 (Fed. Cir. 2015); *Teva Pharm.*, 789 F.3d 1335, 1340–45 (Fed. Cir. 2015).

We disagree. At the outset, we hold this argument waived because Alison did not make this specific argument in its brief to the Commission. *See* 19 C.F.R. § 210.43(b)(2); *Finnigan Corp. v. Int'l Trade Comm'n*, 180 F.3d 1354, 1362–63 (Fed. Cir. 1999). But Alison's argument also fails on the merits. The *Dow Chemical* and *Teva Pharmaceuticals* cases are distinguishable because in those cases there were "multiple methods leading to different results without guidance in the patent or the prosecution history as to which method should be used." *Dow Chem.*, 803 F.3d at 634; *see also Teva Pharm.*, 789 F.3d at 1344–45. Here, in contrast, the '359 patent identifies the applicable methods of measurement and demonstrates their application via examples. Alison has not provided any evidence, moreover, that the different methods of measurement described in the '359 patent lead to different results. Nor do we expect there to be any such incongruity. Because "lofty . . . batting" is expressly defined by the '359 patent based on two properties, bulk and resilience, we find it unremarkable that the specification discloses two methods of measuring loftiness.

Lastly, Alison asserts that the Commission's indefiniteness analysis is improper because it rests on an "irreconcilable contradiction" with its claim construction. Appellant's Br. 19. According to Alison, the ALJ provided a single reason for holding the claim term not indefinite: the specification states that "a lofty batting is 'sufficiently resilient' if 'after compression for a few seconds it will return to at least 70% of its original thickness." *Id.* at 22 (quoting *Claim Construction Order*, App. A at 4). Yet, in construing the term, the ALJ declined to limit "lofty . . . batting" to this specific example of "resilience" in the specification: a material that is compressible by 50% and will return to 70% of its original thickness after a few seconds. Citing no authority, Alison contends that if the 70% example does not limit the scope of the claim, then it must be "irrelevant to indefiniteness." *Id.* at 23. If it is used at all, the 70% example must be a limitation "for all purposes, including infringement." *Id.*

Again, this argument is waived for failure to raise it before the Commission. *See* 19 C.F.R. § 210.43(b)(2); *Finnigan*, 180 F.3d at 1362–63. Alison did not contend that there was any contradiction, or any inadequacy, in the ALJ's indefiniteness analysis based on her reliance on the 70% example. On the merits, furthermore, Alison's argument finds no support in our case law. Nor should it, because there is no "fundamental[] incompatib[ility]" here. Appellant's Br. 23. Under our case law, examples in the specification may be used to inform those skilled in the art of the scope of the invention with reasonable certainty—thus demonstrating that the term is not indefinite—without being directly construed into the claim. *See, e.g.*, *Sonix*, 844 F.3d at 1379; *Enzo*, 599 F.3d at 1334–35.

For the above reasons, we hold that claims 1, 7, and 9 of the '359 patent are not indefinite, and we affirm the Commission's final determination on this ground.

II

We now turn to the Commission's anticipation and obviousness determinations. The Commission affirmed the ALJ's initial determination that claims 1, 7, and 9 of the '359 patent are not anticipated by Ramamurthi. The Commission also affirmed the ALJ's separate determination that claim 9 is not anticipated by and would not have been obvious over Ramamurthi. We affirm the Commission on the anticipation ground without reaching the subsidiary obviousness ground.

A

A patent claim is invalid as anticipated only if each and every element of the claim is expressly or inherently disclosed in a single prior art reference. *See* 35 U.S.C. § 102 (2006);[4] *SRI Int'l, Inc. v. Internet Sec. Sys., Inc.*, 511 F.3d 1186, 1192 (Fed. Cir. 2008). An element may be inherently disclosed only if it "is 'necessarily present,' not merely probably or possibly present, in the prior art." *Rosco, Inc. v. Mirror Lite Co.*, 304 F.3d 1373, 1380 (Fed. Cir. 2002) (quoting *Trintec Indus., Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292, 1295 (Fed. Cir. 2002)). Anticipation is a question of fact that we review for substantial evidence. *Vizio, Inc. v. Int'l Trade Comm'n*, 605 F.3d 1330, 1342 (Fed. Cir. 2010).

B

The Commission affirmed the ALJ's determination that Ramamurthi does not anticipate claims 1, 7, and 9 of the '359 patent because Ramamurthi does not expressly or inherently disclose the "lofty . . . batting" limitation of the

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[4] Because the '359 patent does not contain any claim with an effective filing date on or after March 16, 2013, the applicable version of 35 U.S.C. § 102 is the one preceding the changes made by the America Invents Act. *See* Leahy-Smith America Invents Act § 3(n), 125 Stat. at 293.

challenged claims. Alison relies on the doctrine of inherent disclosure to establish the presence of the "lofty . . . batting" limitation in Ramamurthi. According to Alison, example 1-B of Ramamurthi demonstrates the same properties of "bulk and some resilience" as the ALJ's construction of "lofty . . . batting." Alison also contends that example 2 of Ramamurthi has the same low density and thermal characteristics as the aerogel composites disclosed in the '359 patent. Alison further asserts that a person of ordinary skill in the art would have understood "glass wool," discussed as a preferred fiber in Ramamurthi, to be synonymous with the "fiberglass" expressly identified as a lofty batting in the '359 patent. In view of these disclosures, Alison argues that a person of ordinary skill in the art would have recognized the "glass wool" disclosed in Ramamurthi as a type of "lofty . . . batting" recited in the challenged claims of the '359 patent.

The Commission rejected Alison's arguments in favor of Aspen's detailed expert testimony, which demonstrated that "fiberglass" and "glass wool" each describe broad categories of materials that are not inherently "lofty." With regard to example 1-B, the Commission credited Aspen's expert testimony that the recited properties of bulk and resilience in Ramamurthi reflected that of the *composite*, not its *fibers*, and one cannot necessarily attribute the bulk and resilience of the composite to the fibers contained therein. With regard to example 2, the Commission pointed out that both parties' experts agreed that low density alone "does not inherently create a lofty batting." *Certain Composite Aerogel Insulation Materials*, Inv. No. 337-TA-1003, Comm'n Op., EDIS No. 637154, at 24 (Feb. 22, 2018). The Commission concluded that "[e]ven if some types of glass wool . . . exhibit properties of bulk and resilience, this is not sufficient to demonstrate the inherency of bulk and resiliency in the glass wool . . . disclosed in Ramamurthi." *Id.* at 22.

We are not persuaded that the Commission's determination is unsupported by substantial evidence. Substantial evidence review must be guided by the applicable substantive evidentiary standard. *See Checkpoint Sys.*, 54 F.3d at 761 n.5. Here, Alison bore the elevated burden of clearly and convincingly proving that the "glass wool" or another fiber of Ramamurthi *necessarily* presents the properties of a "lofty . . . batting." *See Rosco*, 304 F.3d at 1380; *see also Motorola Mobility, LLC v. Int'l Trade Comm'n*, 737 F.3d 1345, 1350 (Fed. Cir. 2013) (holding that "substantial evidence supports the Commission's conclusion that Motorola did not present clear and convincing evidence that the operating system *necessarily* required any additional capacity"). The '359 patent itself expressly discusses and distinguishes Ramamurthi, which was also considered by the patent examiner during prosecution and later by the Board in denying Alison's IPR petition. Arguments and references already considered by the Patent Office may carry less weight with the fact finder. *Sciele Pharma Inc. v. Lupin Ltd.*, 684 F.3d 1253, 1260 (Fed. Cir. 2012). Aspen's expert, furthermore, rebutted Alison's expert testimony with detailed testimony supported by industry references.[5] Alison's expert, for his part, merely presented a photo of glass wool pulled from a Wikipedia article, which he identified as lofty without any supporting analysis or testing. While Alison's expert provided a more detailed analysis when seeking to establish the low density of Ramamurthi's fibers, both experts agreed that a low-

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[5] In support of his testimony, Aspen's expert relied in part on an industry handbook that postdated the Ramamurthi reference. The Commission identified this as harmless error because Alison failed to establish its prima facie case of anticipation, and Alison did not contend that the nature of fiberglass and glass wool products had changed since Ramamurthi issued. We agree with the Commission's assessment.

density fiber is not inherently lofty, so this evidence provides little support for Alison's inherency argument.

Alison essentially asks us to reweigh the evidence, which we may not do on substantial evidence review. *See AC Techs. S.A. v. Amazon.com, Inc.*, 912 F.3d 1358, 1367 (Fed. Cir. 2019). Considering the evidentiary record as a whole in light of the elevated burden Alison faced, we conclude that the Commission could reasonably find that claims 1, 7, and 9 of the '359 patent are not anticipated by Ramamurthi. *See Checkpoint Sys.*, 54 F.3d at 761 n.5. Accordingly, we hold that substantial evidence supports the Commission's final determination of no anticipation on this ground, and we affirm.

The Commission also affirmed the ALJ's separate determination that claim 9 is not anticipated by and would not have been obvious over Ramamurthi. Claim 9 depends from claim 1 and additionally recites a specific range of dopant that the parties agree is not expressly disclosed in Ramamurthi. On appeal, Alison asserts that the recited range is inherently disclosed by or would have been obvious over Ramamurthi's disclosure. Because we affirm the Commission's determination that the "lofty . . . batting" limitation of claim 1 is not expressly or inherently disclosed by Ramamurthi, we need not reach this separate ground for claim 9.

CONCLUSION

We have considered the parties' other arguments, and we do not find them persuasive. For the foregoing reasons, we affirm the Commission's final determination that claims 1, 7, and 9 of the '359 patent are not invalid.

AFFIRMED

COSTS

No costs.