

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

JOHNS MANVILLE CORPORATION,
Petitioner,

v.

KNAUF INSULATION, INC.,
Patent Owner.

Case IPR2015-01402
Patent 8,114,210 B2

Before JAMES T. MOORE, KRISTINA M. KALAN, and
JENNIFER MEYER CHAGNON, *Administrative Patent Judges*.¹

KALAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

¹ Judge Frederick E. McKelvey, who participated in the Decision on Institution, is no longer available to participate in this Final Written Decision, having unfortunately passed away during the pendency of this proceeding.

I. INTRODUCTION

Petitioner Johns Manville Corporation filed a Petition (Paper 1, “Pet.”) to institute an *inter partes* review of claims 1–17 of U.S. Patent No. 8,114,210 B2 (Ex. 1001, “the ’210 patent”) pursuant to 35 U.S.C. §§ 311–319. Patent Owner Knauf Insulation, Inc. filed a Preliminary Response (Paper 17, “Prelim. Resp.”). We instituted an *inter partes* review of claims 1, 2, 6, 8, 10, 13, and 14 on certain grounds of unpatentability alleged in the Petition, also including an unadvanced ground under 35 U.S.C. § 103(a) as reasonably likely based upon Petitioner’s evidentiary showing. See Paper 18 (“Dec.”). After institution of trial, Patent Owner filed a Patent Owner Response (Paper 29, “PO Resp.”) and Petitioner filed a Reply (Paper 33, “Reply”). An oral hearing was held on June 27, 2016. A transcript of the hearing has been entered into the record (Paper 44, “Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6. In this Final Written Decision, issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73, we determine that Petitioner has shown by a preponderance of the evidence that all claims for which trial is instituted, namely, claims 1, 2, 6, 8, 10, 13, and 14, are unpatentable.

A. *Related Matters*

The parties indicate that the ’210 patent is the subject of the following district court proceeding: *Knauf Insulation, LLC v. Johns Manville Corp.*, Civil Action No. 1:15-cv-00111-WTL-MJD (S.D. Ind., filed Jan. 27, 2015). Pet. 46; Paper 9, 1; Ex. 1014 (complaint) ¶ 15a.

B. *The ’210 Patent*

The ’210 patent, titled “Binders,” issued on February 14, 2012. The ’210 patent describes an “un-reacted substantially formaldehyde free

curable binder solution for binding loose matter” that “consists essentially of a solution obtainable by dissolving a reducing sugar, an ammonium salt acid precursor optionally a carboxylic acid or a precursor thereof and optionally ammonia in water.” Ex. 1001, at [57]. According to the Specification: “Binder solutions used in accordance with the present invention may be ‘substantially formaldehyde free’, that is to say that they liberate less than 5 ppm formaldehyde as a result of drying and/or curing (or appropriate tests simulating drying and/or curing).” *Id.* at 1:47–51. Further according to the Specification, “[t]he reducing sugar may consist essentially of dextrose.” *Id.* at 3:52. The source of nitrogen may be an amine or an amine reactant, and it “is preferably ammonia in solution.” *Id.* at 3:59–62.

C. Instituted Claims

Claim 1 of the ’210 patent is reproduced below (matter in brackets and some indentation added):

1. A substantially formaldehyde free binder solution consisting essentially of a solution obtainable by dissolving
 - [A] a reducing sugar, and
 - [B] at least 2.5% by dry weight with respect to the reducing sugar of a material selected from the group consisting of
 - [1] ammonium sulphate salts,
 - [2] ammonium phosphate salts,
 - [3] ammonium nitrate salts,
 - [4] ammonium carbonate salts, and
 - [5] combinations thereofin water.

Ex. 1001, 15:2–10. Of the instituted claims, claims 1, 10, and 13 are independent. Claims 2, 6, and 8 depend from claim 1. Claim 14 depends from claim 13.

D. Prior Art References Relied Upon by Petitioner

1. U.S. Patent No. 2,965,504 to Gogek (“Gogek”) (Ex. 1003); and
2. WO 2006/044302 A1 to Helbing (“Helbing”) (Ex. 1005).

Petitioner also relies on the Declaration of Dr. Frederick J. Hirsekorn in support of its arguments. Ex. 1006.

E. Instituted Grounds of Unpatentability

We instituted *inter partes* review on the following grounds of unpatentability asserted in the Petition:

Reference	Basis	Claims Instituted
Gogek	§ 102(b)	1, 2, 6, 8, and 10
Gogek	§ 103	2 and 10
Helbing	§ 102(b)	13 and 14

II. ANALYSIS

A. Claim Construction

The Board interprets claim terms in an unexpired patent according to the broadest reasonable construction in light of the specification of the patent in which they appear. *See Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard); 37 C.F.R. § 42.100(b). Under that standard, and absent any special definitions, we give claim terms their ordinary and customary meaning, as would be understood by one of ordinary skill in the art at the time of the invention. *See 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. *See In re*

Paulsen, 30 F.3d 1475, 1480 (Fed. Cir. 1994). Only those terms which are in controversy need to be construed, and only to the extent necessary to resolve the controversy. See *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

i. Previously Construed Terms

In our Decision on Institution, we gave the claim 10 term “treating” its ordinary meaning. Dec. 11. We stated that, insofar as we could tell, to “treat” means to “act upon with some agent.” *Id.* (citing *Webster's New Collegiate Dictionary*, ISBN 87779-358-1, page 1235 (1973)). We concluded that, under “any claim construction standard, ‘treating’ likely would include pouring or spraying, as well as any other manner of mixing the loose material with the binder.” *Id.*

Also in our Decision on Institution, we stated that, to the extent that a transition phrase requires us to engage in claim construction, recital of “essentially” along with “consisting of” in a claim transition phrase has been interpreted as rendering the claim open only for the inclusion of unspecified ingredients which do not materially affect the basic and novel characteristics of the composition. *Id.* at 5 (citing *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948)). We noted that the 1948 construction by the Board of Appeals of “consisting essentially” was adopted by the CCPA, and has been followed by the Federal Circuit: *In re Janakirama-Rao*, 317 F.2d 951, 952 (CCPA 1963); *In re De Lajarte*, 337 F.2d 870, 873 (CCPA 1964); *In re Herz*, 537 F.2d 549, 551–52 (CCPA 1976); and *PPG Indus. v. Guardian Indus. Corp.*, 156 F.3d 1351, 1354 (Fed. Cir. 1998). *Id.*

Petitioner agrees that by using the term “consisting essentially of,” the drafter “signals that the invention necessarily includes the listed ingredients

and is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention.” Pet. 8; Reply 6 (citing *PPG Indus.*, 156 F.3d at 1354). Patent Owner does not disagree, stating that “consisting essentially of” limits the scope of a claim to “the specified materials or steps ‘and those that do not *materially* affect the *basic* and *novel* characteristic(s)’ of the claimed invention.” PO Resp. 6 (citing *In re Herz*, 537 F.2d at 551–52) (italics in original).

Although the parties discuss and apply these claim constructions, neither party specifically contests these claim constructions. We see no reason to modify them in light of the record developed at trial. Apart from our discussion of “substantially formaldehyde free binder,” below, all other terms do not require construction.

ii. Substantially Formaldehyde Free Binder

The preamble of claim 1 recites: “A substantially formaldehyde free binder solution. . . .” Ex. 1001, 15:2–3.

“In general, a preamble limits the invention if it recites essential structure or steps, or if it is ‘necessary to give life, meaning, and vitality’ to the claim.” *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (citing *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). “Whether to treat a preamble as a limitation is a determination ‘resolved only on review of the entire[] . . . patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim.’” *Id.* at 808 (quoting *Corning Glass Works v. Sumitomo Electric U.S.A., Inc.*, 868 F.2d 1251, 1257 (Fed. Cir. 1989)).

“Where a patentee uses the claim preamble to recite structural limitations of his claimed invention, the PTO and courts give effect to that usage.” *Rowe v. Dror*, 112 F.3d 473, 478 (Fed. Cir. 1997); *Bell Commc’ns Research, Inc. v. Vitalink Commc’ns Corp.*, 55 F.3d 615, 620 (Fed. Cir. 1995) (“[W]hen the claim drafter chooses to use *both* the preamble and the body to define the subject matter of the claimed invention, the invention so defined, and not some other, is the one the patent protects.”).

Both parties, in their briefs, present arguments directed to whether Gogek is substantially formaldehyde free. PO Resp. 15–17; Reply 15–17. Neither party expressly discusses, in its briefs, the issue of whether the term “substantially formaldehyde free binder” is limiting. Patent Owner, by arguing that Petitioner “points to no part of Gogek that expressly teach[es] a substantially formaldehyde free ‘binder solution’ as required by claim 1,” implicitly argues that the term “substantially formaldehyde free binder” in claim 1 is limiting. PO Resp. 15. At oral hearing, when presented with this question, Petitioner opined that “substantially formaldehyde-free” was not limiting. Tr. 9:18–10:5 (stating that the preamble does not add life and vitality to the claim). Patent Owner opined that it was limiting as to all of the claims. *Id.* at 28:21–24, 36:3–7.

Our consideration of the evidence leads us to the conclusion that the term “substantially formaldehyde-free” in the preamble of claim 1 is limiting. The term “formaldehyde free” appears prominently in the Specification. The Abstract describes the invention as an “un-reacted substantially formaldehyde free curable binder solution.” Ex. 1001, at [57]. The Background states: “One of the many advantages of this binder system is that it is formaldehyde free.” *Id.* at 1:30–31. In the Summary section, the

Specification devotes two of its four paragraphs to discussing the substantially formaldehyde free nature of the invention. *Id.* at 1:48–67.

The term “substantially formaldehyde free binder” appears prominently in the claims as well. Every instituted claim dependent from claim 1 recites “The substantially formaldehyde free binder solution of claim 1” or “The substantially formaldehyde free binder solution in accordance with claim 1.” *Id.* at 15:11–16:2. In claim 13, the term “substantially formaldehyde free binder” appears after the introductory term (“A material comprising”) such that it does not appear in the preamble *per se*, but rather, after the transitional phrase “comprising.” *Id.* at 16:19–21. Claim 10 includes the term “the substantially formaldehyde free binder of claim 1” in the body of the claim. *Id.* at 16:6–7.

Claim 1 and its instituted dependent claims all are directed to a binder; in each case, the binder is substantially formaldehyde free. The term “substantially formaldehyde free” recites a physical limitation of the claim, in that the “substantially formaldehyde free” aspect of the binder is a limitation on its composition. The limitations in all of the instituted claims rely upon or derive essential structure from the preamble, in that the binder in each case is substantially formaldehyde free, in addition to containing the components specified in the dependent claims. Every claim depending from claim 1 recites “[t]he substantially formaldehyde free binder solution” of claim 1. *Id.* at 15:11–16:2. Thus, we determine the use of “substantially formaldehyde free binder” in the preamble of claim 1 and its instituted dependent claims denotes a limitation of the claimed binder.

B. Grounds Based on Gogek

Petitioner challenges claims 1, 2, 6, 8, and 10 as anticipated under 35 U.S.C. § 102(b) by Gogek. Pet. 5.

i. Gogek

Gogek describes “insulating blocks which are highly moisture resistant . . . prepared from [1] refractory materials and [2] a binder consisting essentially of [a] a sugar and [b] a chemical adjunct.” Ex. 1003, 1:30–33. Gogek states that “[b]entonite, which has excellent binding capacity at high temperatures also may be included.” *Id.* at 1:21–22. The sugar can be dextrose. *Id.* at 1:51–52. The chemical adjunct can be ammonium sulfate. *Id.* at 1:72. The “amount of adjunct in the total binder may range from 1 to 15 percent, dry basis.” *Id.* at 1:69–71. In Example 1, the ammonium sulfate is 6.38% by dry weight with respect to the dextrose [$0.18/2.82 = 0.0638 = 6.38\%$]. *Id.* at 2:10–18; *see also* Ex. 1006 ¶ 74.

ii. Anticipation Analysis

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Anticipation requires “that the reference describe not only the elements of the claimed invention, but also that it describe those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008) (quoting *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008)).

As a preliminary matter, Patent Owner presents a number of general arguments in support of its assertion that Gogek does not enable the inventions of claims 1, 2, 6, 8, and 10, and thus cannot anticipate. PO

Resp. 3–13. Namely, Patent Owner argues that (a) anticipation requires that the unmodified reference—here, Gogek—must enable the claimed invention (*id.* at 4); (b) anticipation requires proper construction of the claim term “consisting essentially of” (*id.* at 5); and (c) Gogek requires clay (*id.* at 8). These arguments are not specific to any of the instituted claims, and thus, we address them before we address the parties’ arguments directed to the specific claims at issue. Taking these arguments out of order, we address each in turn.

Clay

The heart of Patent Owner’s argument appears to be that Gogek requires clay: “Gogek’s brick, like most any brick, requires clay.” PO Resp. 8. Patent Owner argues, specifically, that “every single example in Gogek uses clay,” or, alternately, Gogek “expressly states that clay ‘is used’ in such bricks.” *Id.* at 8–9. Patent Owner concludes that the presence of clay would not work in the invention of claim 1. *Id.* at 11. First, Patent Owner argues, Petitioner’s argument that Gogek’s claim 2 discloses a refractory brick made without clay is “contrary to law” because there cannot be two forms of claim construction—one for Gogek and one for the ’210 patent. *Id.* at 12. Second, Patent Owner argues, the product of Gogek’s claim 2 does not even meet Gogek’s definition of his invention. *Id.* at 13.

Petitioner replies that Gogek does not require clay or asbestos. Reply 3. Gogek does not require bentonite, or any clay for that matter, argues Petitioner; the binder in Gogek is solely a “sugar and adjunct mixture.” *Id.* at 4, 8 (citing Ex. 1003, 1:66–67). Neither clay nor asbestos “is part of the *binder* disclosed in Gogek,” but rather, argues Petitioner, part of the refractory material. *Id.* at 8. Furthermore, Petitioner argues that the

claims of the '210 patent are directed to a binder “solution” rather than a “suspension,” which is a different type of mixture than would result if clay and asbestos were part of the mixture. *Id.* at 9 (citing Ex. 1016, 44:12–23, 45:15–46:10). Thus, Petitioner concludes, “even if Gogek required the presence of refractory materials such as bentonite, iron oxide or asbestos in its insulating blocks, that is irrelevant” because “claim 1 of the '210 patent is limited solely to a binder solution. And the binder of Gogek anticipates the binder claimed in claim 1 of the '210 patent.” *Id.* at 11.

As a preliminary matter, claim 1 is directed to a binder solution, not a brick. Gogek, too, discusses a binder, teaching an insulating block that “can be prepared from refractory materials and a binder consisting essentially of a sugar and a chemical adjunct.” Ex. 1003, 1:31–33. Gogek repeatedly characterizes its binder as being made up of sugar and adjunct: “binder consisting essentially of a sugar and a chemical adjunct” (*id.* at 1:32–33); “[t]he amount of total binder, i.e. the sugar and adjunct mixture, in the formulation may vary” (*id.* at 1:66–67); “a sugar-ammonium sulfate binder” (claim 1, *id.* at 3:11–12, 3:15–16); and “a sugar-inorganic adjunct binder” (claim 2, *id.* at 3:23; claim 3, *id.* at 3:32; claim 4, *id.* at 4:10; claim 5, *id.* at 4:20). We have not been made aware of any portion of Gogek that expressly characterizes the binder itself as having other ingredients.

Patent Owner’s argument that “Gogek’s brick . . . requires clay” begins with a premise that attempts to focus attention on Gogek’s brick or insulating block, rather than its binder. Gogek describes some of the materials used in insulating block manufacture as follows: “A variety of materials is used in their manufacture, e.g., iron oxide, rock wool, asbestos, clay.” Ex. 1003, 1:18–20. Patent Owner interprets this to mean that Gogek

“expressly states that clay ‘is used’ in such bricks.” PO Resp. 9. This passage, however, does not explicitly state that clay is part of the binder. Moreover, as Petitioner notes, “e.g.” in this sentence means that some examples are given. Reply 4–5. Patent Owner points us to no authority showing that a list of materials given as an e.g.-type list of examples is exclusive, or mandatory. Moreover, claim 2 in Gogek is directed to a brick made without iron oxide, asbestos, or clay, all of which are part of this list. Ex. 1003, 3:21–28. Thus, we are not persuaded that the presence of “clay” in this exemplary list, by itself, means that clay is required, either in the brick, or in the binder.

Patent Owner also argues that “Gogek states that the required clay is *preferably* bentonite clay.” PO Resp. 8. This statement is unsupported. As discussed above, clay is not required in Gogek’s bricks. Moreover, bentonite is not mentioned as being a required constituent of the binder or of the brick. On the contrary, Gogek states that “[b]entonite which has excellent binding capacity at high temperatures also *may be included*.” Ex. 1003, 1:21–22 (emphasis added). Something that may be included simply cannot be the essence of any invention. Similarly, with respect to different materials used in the manufacture of insulating blocks, Gogek describes “[a] variety of material[s] . . . e.g., iron oxide.” *Id.* at 1:19–20. As discussed above, iron oxide is described as being an example, not a required ingredient. Relating this optional language to the claims, we note that while Gogek claims a refractory insulating block containing bentonite and iron oxide in claim 4 (*id.* at 4:9), claim 2 to a refractory insulating block does not include a bentonite or iron oxide limitation. This construction of claim 2 is not at odds with the specification of Gogek, as urged by Patent Owner. PO

Resp. 12. Rather, it is consistent with Gogek's disclosure that clay is an exemplary material, and that bentonite is optional. Claims often are directed to a narrower embodiment or disclosure than those presented in the specification as a whole. *See TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008). The fact that other materials are disclosed as exemplary materials in the specification of Gogek does not detract from the statement that bentonite is optional, or from the block claimed in claim 2, which is directed to a block of rock wool and a sugar-ammonium sulfate binder. Thus, clay or bentonite is not required to be part of Gogek's binder or brick.

Enablement

In its argument concerning enablement, Patent Owner argues that "Gogek requires clay to work; and, yet Gogek's 3% clay would not work in (i.e. enable) the present invention." PO Resp. 4 (citing Ex. 2019 ¶¶ 7–15). Patent Owner argues that a "reference may not be modified to achieve anticipation." *Id.* at 5. Specifically, Patent Owner argues that Petitioner's assertion of anticipation "disregards Gogek's required clay and asbestos fines," and that for anticipation purposes, "one cannot modify Gogek by ignoring these required clay and asbestos fines components." *Id.* Patent Owner also raises arguments about enablement in its section regarding clay, stating that "without clay as a binder, Gogek's blocks 'would not work under the practical conditions disclosed in the Gogek reference.'" *Id.* at 9. Patent Owner supports this statement with testimony from its expert, Dr. Smith. Ex. 2019 ¶¶ 10–11 (stating that a Gogek-type brick would be fragile and crumble during ordinary handling and use). Patent Owner also argues that the product of Gogek's claim 2 "is not sufficient to firmly hold the claimed

amount of refractory materials together in a ‘cemented mass.’” PO Resp. 13 (citing Ex. 2019 ¶ 14).

Petitioner replies that the claimed and unclaimed material in a prior art patent is presumed enabled. Reply 3 (citing *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1355 (Fed. Cir. 2003) (noting that both the claimed and unclaimed disclosures in a prior art patent are presumed enabled)). Petitioner faults Patent Owner for not considering the *Wands* factors in its discussion of enablement. *Id.* at 6 (citing *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988)). As argued by Petitioner, Gogek expressly discloses that bentonite, or any clay for that matter, is not required. *Id.* at 4 (citing Ex. 1003, 2:5–8). Petitioner also notes that claim 2 of Gogek does not include a bentonite limitation. *Id.* at 5. Regarding Patent Owner’s expert testimony, Petitioner notes that Dr. Smith “never performed any testing to support his conclusions of what he ‘would expect’ to happen.” *Id.* at 6 (citing Ex. 2019 ¶ 10; Ex. 1016, 18:23–19:10). Petitioner alleges that Dr. Smith concedes that he has “no actual knowledge of what Gogek used or did not use in the making of insulating blocks.” *Id.* at 7 (citing Ex. 1016, 18:14–22). Petitioner faults Dr. Smith’s statements as “entirely speculative” and “irrelevant.” *Id.*

As noted by Petitioner, a prior art patent is presumed enabled. *See Amgen Inc.*, 314 F.3d at 1355. A patent owner may overcome the presumption of enablement by establishing with persuasive evidence that the prior art does not enable the claimed invention. *Impax Labs., Inc. v. Aventis Pharm., Inc.*, 545 F.3d 1312, 1316 (Fed. Cir. 2008). Regarding burdens of proof in our proceedings, “there are two distinct burdens of proof: a burden of persuasion and a burden of production.” *Dynamic Drinkware, LLC v.*

Nat'l Graphics, Inc., 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)). “In an *inter partes* review, the burden of persuasion is on the petitioner to prove ‘unpatentability by a preponderance of the evidence,’ 35 U.S.C. § 316(e), and that burden never shifts to the patentee.” *Id.* The burden of production, however, may shift between the parties and involves “producing additional evidence and presenting persuasive argument based on new evidence or evidence already of record.” *Id.* at 1379 (quoting *Tech. Licensing*, 545 F.3d at 1327). Given the allocation of the burden of production regarding the question of enablement, we are not presented with any facts or argument by Patent Owner persuading us that Patent Owner has met its burden.

Analysis of enablement of an anticipation reference contemplates consideration of whether undue experimentation would be required to practice an invention. *See, e.g., Elan Pharms., Inc. v. Mayo Found. for Med. Ed. & Research*, 346 F.3d 1051, 1054 (Fed. Cir. 2003) (the reference must teach how to carry out the invention without undue experimentation). The factors relevant to whether experimentation is undue are discussed in, *e.g., In re Wands*, 858 F.2d at 737; *Cephalon, Inc. v. Watson Pharma, Inc.*, 707 F.3d 1330, 1336 (Fed. Cir. 2013). These factors include:

- (1) the quantity of experimentation necessary,
- (2) the amount of direction or guidance presented,
- (3) the presence or absence of working examples,
- (4) the nature of the invention,
- (5) the state of the prior art,
- (6) the relative skill of those in the art,
- (7) the predictability or unpredictability of the art, and
- (8) the breadth of the claims.

Cephalon, 707 F.3d at 1336.

We have on this record an absence of a complete analysis by Patent Owner of the *Wands* factors. Rather, to the extent that Patent Owner makes enablement arguments, it mixes them with its other general arguments without clearly setting forth how it believes Gogek is not enabled. Patent Owner does not tie these disparate arguments to the *Wands* factors. This incomplete analysis is insufficient to rebut the presumption that the prior art is enabled. Patent Owner's reliance on Dr. Smith's testimony to bolster its arguments does not aid its case. Dr. Smith essentially states what Patent Owner argues in the Response (Ex. 2019 ¶¶ 7–12), and provides no persuasive facts or data to support his opinions. We give such conclusory, unsupported assertions by Patent Owner's expert little weight. *See In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1368 (Fed. Cir. 2004) (“[T]he Board is entitled to weigh the declarations and conclude that the lack of factual corroboration warrants discounting the opinions expressed in the declarations.”); *see also* 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”). Without further facts or experiments backing up Dr. Smith's testimony, we are disinclined to accept Patent Owner's arguments based on the same.

On this record, and given the allocation of the burdens, we have insufficient reasons or evidence to overcome the presumption of enablement. Accordingly, we are not persuaded by Patent Owner's argument that Gogek is not enabled.

“Consisting Essentially Of”

Patent Owner argues that the transition phrase “consisting essentially of” has settled legal meaning, limiting the scope of a claim to the specified materials or steps, and those that do not materially affect the basic and novel characteristics of the claimed invention. PO Resp. 5–6. Specifically, Patent Owner argues, the “interpretation of this exclusionary claim term, ‘consisting essentially of,’ is critical because it informs the ways in which the ‘210 Patent is distinct from the cited Gogek patent with its clay (Gogek’s permanent binder) and with its use of the now eschewed asbestos.” *Id.* at 7.

Petitioner replies that Patent Owner’s expert testified that adding either clay or asbestos would materially affect the binder characteristics of the formulations in Gogek. Reply 6. Thus, Petitioner reasons, Gogek’s claim 2 and its “consisting essentially of” language describes insulating blocks that not only do not, but necessarily must not, include any clay or asbestos. *Id.* at 6 n.2. Moreover, Petitioner argues, the “consisting essentially of” language of claim 1 of the ‘210 patent applies only to the binder, regardless of its ability to be applied to any number of materials. *Id.* at 10. Patent Owner, according to Petitioner, improperly conflates the binder of Gogek with the materials to which it is applied. *Id.* Thus, even if Gogek required the presence of certain refractory materials, “that is irrelevant because claim 1 of the ‘210 patent is limited solely to a binder solution.” *Id.* at 11. And even if clay were required in Gogek, Petitioner argues, the ‘210 patent discloses use of the claimed binder with clay. *Id.* at 12. The ‘210 patent discloses use of the claimed binder with foundry sands, argues Petitioner, and according to Patent Owner’s expert, bentonite is a component in foundry sands. *Id.* at 12–13 (citing Ex. 1001, 7:36–41

(including foundry sands in an exemplary list of loose matter that may be shaped, dimensioned, or molded with the aid of the binder); Ex. 1016, 11:9 (“Bentonite is a component in foundry sands, yes.”)); *see also* Ex. 2024, 2 (errata sheet changing “in foundry sands” in Ex. 1016, 11:9 to “in many foundry sands.”).

Claim 1 includes the language “binder solution consisting essentially of.” As discussed above, and as agreed to by the parties, the phrase “consisting essentially of” has an established legal meaning. The binder of the claimed invention, therefore, necessarily includes the mixture of the specified elements: (1) a reducing sugar and (2) one of the specified ammonium salts, in water. The binder of the claimed invention is open to unlisted ingredients that do not materially affect the basic and novel properties of the invention.

Patent Owner states that “Gogek’s 3% clay would not work in (i.e. enable) the present invention,” indicating that Patent Owner believes clay would materially affect the basic and novel properties of the invention. PO Resp. 4. Patent Owner also states that inclusion of clay and asbestos fines “would materially degrade the rapid cure time of the ’210 Patent’s claimed binder.” *Id.* at 7. Thus, Patent Owner takes the position that the ingredients clay and asbestos would materially alter the basic and novel properties of the invention. From this argument, we take away that Patent Owner’s position is that claim 1 should not be read to allow the inclusion of clay or asbestos.

As discussed above, we do not read Gogek as requiring clay. Even if we were to read claim 1 as open to inclusion of clay, which we do not, we note Patent Owner’s statement regarding the foundry sands identified in the

'210 patent: "Foundry sands, as per Dr. Smith's testimony, may include clay. And one version of that is bentonite clay." Tr. 42:9–11.

For reasons similar to those given in our discussion of whether Gogek requires clay, and notwithstanding Patent Owner's arguments to the contrary, we do not read Gogek as requiring asbestos. Like clay, asbestos is listed in Gogek as an exemplary material in the manufacture of bricks. Ex. 1003, 1:18–20. Asbestos is not included in the rock wool block of claim 2. *Id.* at 3:20–29. Regarding the binder alone, Gogek repeatedly refers to its binder as a sugar-inorganic adjunct binder and nowhere states that its binder includes asbestos.

Accordingly, the term "consisting essentially of" in claim 1 does not undermine or render inconsistent Petitioner's positions with respect to anticipation by Gogek. We further examine the parties' arguments in the context of the specific claims on which we instituted *inter partes* review.

Claim 1

Petitioner argues that Gogek discloses every element of claim 1. Pet. 10. Claim 1 requires two elements: (1) a reducing sugar and (2) a material which can be an ammonium sulphate salt, in water. Specifically, Petitioner argues that Gogek discloses a binder that consists essentially of a sugar and a chemical adjunct, which can be dextrose and ammonium sulfate, respectively. *Id.* at 12 (citing Ex. 1003, 1:31–33, 1:50–52, 1:72). According to Petitioner, Gogek's disclosure that "the amount of adjunct in the total binder may range from 1 to 15 percent, dry basis," as well as the disclosure of Example 1, meet the "at least 2.5% by weight" limitation of claim 1. *Id.* at 13, 14 n.2 ("0.18 parts ammonium sulfate/2.82 parts dextrose * 100 = 6.38% by weight ammonium sulfate with respect to the dextrose. Ex. 1006,

¶ 74.”). Petitioner argues that Gogek discloses the “in water” limitation because “it repeatedly discloses that the reducing sugar and ammonium sulfate are slurried in ‘600 to 1000 parts of water’ – an amount of water that would easily dissolve the binder components.” *Id.* at 14.

Patent Owner argues that “Gogek does not enable a product made without clay, and the presence of clay takes Gogek’s refractory bricks outside of the scope of claim 1.” PO Resp. 13–14. Petitioner replies that refractory materials are not part of the binder solution in Gogek, and so even if clay or asbestos were required to be present in Gogek’s brick, they would be part of the refractory material and not part of the binder. Reply 8. We have addressed Patent Owner’s clay argument above, and are persuaded that Gogek enables a binder as claimed in claim 1.

Patent Owner also argues that asbestos fines are present in all of Gogek’s examples, and by contrast, the “essence” of the claimed invention of the ’210 patent is far different than Gogek. PO Resp. 15. Petitioner replies that asbestos is one of the exemplary refractory materials disclosed in Gogek, and not part of the binder. Reply 14. The presence of asbestos fines in the examples of Gogek, as part of its refractory bricks, does not mean that asbestos fines are part of the binder of Gogek. As discussed above, we are persuaded by Petitioner’s argument on this point that Gogek’s binder consists essentially of a reducing sugar and a material which can be an ammonium sulphate salt, in water, and that asbestos fines are not required by Gogek as part of its binder.

Patent Owner argues that Petitioner offers no proof that Gogek is inherently formaldehyde free. PO Resp. 15–16. It is not enough that Gogek is silent as to the presence of formaldehyde, according to Patent Owner,

because that does not permit any certainty, only possibilities that are not enough to find that the prior art inherently discloses something not explicitly present. *Id.* at 16–17 (citing *In re Giuffrida*, 527 F. App’x 981, 984–86 (Fed. Cir. 2013); *Ex parte Caylor*, Appeal No. 2011-008585, 5–6 (BPAI July 25, 2013)). Patent Owner also relies on Exhibits 2020 and 2021, which discuss the presence of formaldehyde in certain sugar syrups in 1961 and 1908, respectively. *Id.* at 17.

Petitioner replies that Gogek discloses substantially formaldehyde-free insulating blocks. Reply 15. Petitioner relies on its expert testimony that “Gogek does not disclose the use of (1) formaldehyde, or (2) any components that would produce formaldehyde during any of the disclosed processing steps.” *Id.* (citing Ex. 1006 ¶ 67). Petitioner argues that Gogek does not have to say that “dextrose hydrate and ammonium sulfate don’t have formaldehyde in them” because Gogek “discloses the entire composition of the binder” and the “chemical makeup of both ingredients is well known.” Tr. 10:23–11:3. Petitioner notes that this evidence is largely unchallenged by Patent Owner and that Patent Owner’s expert is silent on the issue. *Id.* at 12:7–19. Regarding the relied-upon references, Petitioner argues that Exhibit 2021 describes sugar production at a specific plant in Louisiana in 1908, fifty years before Gogek, and Exhibit 2020 teaches that trace amounts of formaldehyde were found in maple syrup, not dextrose. *Id.* at 62:3–63:7.

Given that there are an almost infinite number of compounds that Gogek might not include, it does not seem practical to impose upon Petitioner or Gogek an obligation to enumerate all the compounds Gogek does not contain. We credit Petitioner’s expert on the matter that Gogek

does not disclose use of (1) formaldehyde, or (2) any components that would produce formaldehyde during any of the disclosed processing steps. As a matter of chemistry, we have no persuasive evidence that Gogek's disclosed binder of dextrose hydrate and ammonium sulfate relied upon by Petitioner would also include formaldehyde.

Moreover, based on our review of the two references relied upon by Patent Owner, they do not demonstrate that "formaldehyde's use was widespread and unquestioned" in Gogek's time. PO Resp. 16. On the contrary, if anything, the obscurity of the references demonstrates how deeply Patent Owner would have had to search to unearth a reference that mentioned formaldehyde and a sugar together. Accordingly, we are sufficiently persuaded that Gogek is substantially formaldehyde free.

Claim 2

Claim 2 calls for a binder consisting essentially of dextrose and at least 7% of the salt material. Ex. 1001, 15:11–14. Gogek describes the amount of adjunct in the binder as being in the range from 1 to 15 percent, dry basis. Ex. 1003, 1:69–71. Petitioner argues that Gogek discloses the additional limitation of claim 2 because "Gogek discloses a scenario where the ammonium sulfate is present in an amount of 17.6% by dry weight with respect to the dextrose," namely, "the ammonium sulfate is 15%, and the dextrose is 85% of the total binder by dry weight." Pet. 15. Thus, Petitioner argues, "the ammonium sulfate is 17.6% by dry weight with respect to the dextrose"—an amount greater than the "at least 7%" required by Claim 2. *Id.*

There is precedent holding that a prior art temperature range of 100 to 500 °C does not anticipate a claimed range of 330 to 450 °C. *Atofina v.*

Great Lakes Chem. Corp., 441 F.3d 991, 999 (Fed. Cir. 2006). Thus, it might be argued that a range of 1% to 15% likely does not anticipate a claimed range of at least 7%—the overlap being from at least 7% to 15%. On the other hand, in *ClearValue, Inc. v. Pearl River Polymers, Inc.*, 668 F.3d 1340 (Fed. Cir. 2012), a claimed range of “less than or equal to 50 ppm” was anticipated by range of “150 ppm or less.” The *ClearValue* court noted that the prior art reference also described a 60–70 ppm range and that the process behaved the same at “150 ppm or less” as it did at “less than or equal to 55 ppm.” *Id.* at 1345.

In *Ineos USA LLC v. Berry Plastics Corp.*, 783 F.3d 865 (Fed. Cir. 2015), a range of 0.05% to 0.5% was held to be anticipated by a prior art range of 0.1% to 5% because the range was not “critical,” i.e., compositions within the range of 0.05% to 0.5% were not shown to perform differently than the prior art compositions within the range 0.1% to 5%. On this basis, we believe *Ineos* distinguished *Atofina*. In our Decision on Institution, we stated that, based on *Ineos*, there was a reasonable likelihood that claim 2 was anticipated by Gogek.

Patent Owner argues that Gogek’s range of adjunct in the total binder is not a range of values pertaining to ammonium sulfate with respect to dextrose. PO Resp. 18. Specifically, Patent Owner argues that “Gogek’s expansive statement that the ‘amount of adjunct in the total binder may range from 1 to 15 percent dry basis’ does not mean that the full 1 to 15 percent range applies to each individual sugar/adjunct combination that might be assembled” *Id.* Patent Owner relies on Dr. Smith’s testimony that this broad range cannot be reasonably applied across every one of the widely varying sugars disclosed in Gogek. *Id.* at 20 (citing Ex. 2019 ¶ 24).

Regarding the case law, Patent Owner argues that *Ineos* stands for the proposition that disclosure of a range does not constitute a specific disclosure of the endpoints of that range. *Id.* at 21.

Petitioner criticizes as unsupported Patent Owner's statement that Gogek's "1 to 15 percent, dry basis" statement does not apply to all the combinations of sugar and adjunct. Reply 17. Petitioner further criticizes as speculation Dr. Smith's testimony that "each individual adjunct has some appropriate level for each individual sugar, presumably falling within some undisclosed portion of the 1–15% range" and that the unqualified disclosure in Gogek "cannot be reasonably applied across every one of the widely varying sugars in Gogek." *Id.* (citing Ex. 2019 ¶ 24).

Gogek gives us no reason, and we are made aware of no other reason, that the Gogek disclosure of "1 to 15 percent, dry basis" cannot be applied to each possible combination of the limited numbers of sugars and adjuncts disclosed in Gogek. We are aware of Dr. Smith's testimony that "each individual adjunct has some appropriate level for each individual sugar." Ex. 2019 ¶ 24. Although possibly true, this statement is not persuasively supported by any specific facts or reasoning that would support an assertion that the ratio of dextrose hydrate to ammonium sulfate would not be within the range claimed in claim 2. Given the 1–15% disclosure of Gogek, there are many scenarios, not necessarily based on the endpoint of 15%, that would meet the at least 7% by dry weight of salt material limitation of claim 2. Moreover, we are not aware of any assertion of criticality of the range. There is no indication in Gogek, or from the record before us, that the binder would behave differently when the amount of adjunct is 1% than

it would at 15% or any percent in between. Given the totality of the record before us, we are persuaded that Gogek anticipates claim 2.

Claim 6

With respect to claim 6, which requires that the adjunct “makes up between 5% and 25% by dry weight of the binder solution,” Petitioner again argues that Gogek teaches that “the amount of adjunct in the total binder may range from 1 to 15 percent, dry basis.” Pet. 16 (citing Ex. 1003, 1:69–70). Petitioner also relies on Example 1 of Gogek, where the dry binder components are 2.82 parts dextrose hydrate and 0.18 parts ammonium sulfate, such that “the ammonium sulfate salt constitutes more than 6% by dry weight of the binder solution.” *Id.* at 16–17.

Patent Owner argues that Gogek does not disclose that the salt “makes up between 5% and 25% by dry weight of the binder solution.” PO Resp. 23. Patent Owner refers to its claim 2 discussion to support its argument that Gogek does not disclose the required range with sufficient specificity. *Id.*

Petitioner replies that in Example 1 of Gogek, which discloses 2.82 parts dextrose hydrate and 0.18 parts ammonium sulfate, “ammonium sulfate salt makes up 6% by dry weight of the binder solution” and that “[s]ix percent falls within the 5%–25% range recited.” Reply 21. We follow and adopt Petitioner’s reasoning with respect to its anticipation arguments of claim 6 based on Gogek.

Claim 8

With respect to claim 8, Petitioner argues that, because the binder contains only sugar and adjunct, “under the disclosed scenario where there are 15 parts ammonium sulfate in the binder, there are 85 parts sugar.”

Pet. 17–18 (citing Ex. 1006 ¶ 82). This yields a ratio of 5.7, according to Petitioner, which is in the 2.5 to 13 range required by claim 8. *Id.* at 18.

Patent Owner argues that Gogek Example 1 includes 2.82 parts dextrose hydrate and 0.18 parts ammonium sulfate, and the ratio of dry weight of reducing sugar to the dry weight of salt material of 15.67 (2.82/0.18), which does not anticipate the claim 8 range of 2.5 to 13. PO Resp. 24. Patent Owner also takes issue with Petitioner’s reliance on the 85 parts dry dextrose/15 parts dry ammonium sulfate calculation, resulting in a ratio of 5.7, in that it “improperly relies on an endpoint and cannot form the basis for anticipation.” *Id.*

Petitioner replies that, for substantially the same reasons given for claim 2, Gogek anticipates claim 8. Reply 21. We are not aware of any reason that the disclosure of Gogek’s Example 1 is the only disclosure upon which we should rely. For many of the same reasons given above in our analysis for claim 2, and given the disclosure in Gogek that the amount of adjunct in the total binder may range from 1 to 15 percent, dry basis, there is persuasive evidence to conclude that are many suitable ratios that fit within the 2.5 to 13 range required by claim 8.

Claim 10

With respect to claim 10, Petitioner argues that Gogek anticipates a method of manufacturing according to the claim, including providing a collection of loose matter, treating the collection of loose matter with the substantially formaldehyde free binder solution of claim 1, arranging the collection of loose matter treated with the binder solution into the shape of the product, and curing the binder by applying a source of energy. Pet. 18–20.

Patent Owner argues that claim 10 is not anticipated for at least the same reasons that claim 1 is not anticipated. PO Resp. 24. Petitioner replies that, for the same reasons given for claim 1, Gogek anticipates claim 10. We adopt Petitioner's analysis in its Petition as to the location of each of the cited elements of claim 10 in Gogek. For substantially the same reasons given for our analysis of claim 1, we are persuaded that Gogek anticipates the steps of method claim 10.

iii. Obviousness Analysis

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 at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of 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. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). A decision on the ground of obviousness must include “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). It has been said that “anticipation is the epitome of obviousness.” *Connell v. Sears, Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983).

In our Decision on Institution, we instituted *inter partes* review of claims 2 and 10 under § 103. Dec. 19. With respect to claim 2, we stated that a range of at least 7% overlaps with a range of 1% to 15% at least in the

sub-range of at least 7% to 15%. *Id.* at 8. A *prima facie* case of obviousness typically exists when the ranges of a claimed composition overlap the ranges disclosed in the prior art. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003). Accordingly, we stated that if claim 2 were not anticipated, there was a reasonable likelihood that the range of at least 7% of claim 2 would have been obvious over a range of 1% to 15%. Dec. 8.

Regarding claim 2, Patent Owner argues that there is no valid rationale for modifying the specific amounts enumerated in Example 1 of Gogek. PO Resp. 22. Patent Owner also argues that that Gogek's specific examples counsel away from any random experimentation with the amounts specified for the components parts. *Id.* Petitioner relies on *In re Peterson*, 315 F.3d at 1330, for the proposition that it is "[t]he normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages." Reply 20. Given this motivation and the overlapping ranges in Gogek and claim 2, Petitioner argues that claim 2 should be found unpatentable as obvious over Gogek. *Id.*

Because "anticipation is the epitome of obviousness," our determination that claim 2 is anticipated by Gogek informs our determination here that claim 2 is also obvious over Gogek. *See Connell*, 722 F.2d at 1548. Moreover, we are persuaded that the disclosed range in Gogek, together with a limited number of examples given in Gogek, would motivate those of ordinary skill in the art to seek other working combinations within the disclosed range.

Regarding claim 10, we stated in the Decision on Institution that the ingredients in Gogek's Example 1 are acted upon by the dextrose hydrate and ammonium sulfate, and thus are likely "treated" with dextrose hydrate and ammonium sulfate. Dec. 11. In other words, we stated, the order in which ingredients are prepared and mixed likely would not have any meaningful impact on the final product. *Id.* at 12. The parties do not appear to address the "treating" issue head-on, and we are not given any reason to alter the analysis in our Decision on Institution. There, we concluded that we could not discern any likely significant § 103(a) patentable difference. *Id.* at 11. Patent Owner argues that claim 10 "is not rendered obvious over Gogek alone at least because [Petitioner] has not proven that there is a reason to modify Gogek to overcome any of Gogek's deficiencies as to claim 1." PO Resp. 24. Petitioner replies that Gogek renders claim 10 obvious for the reasons discussed in the Petition and in the Decision on Institution. Reply 21–22. As noted above, we are persuaded that Gogek anticipates claim 1, as well as claim 10. We are similarly persuaded that Gogek renders claim 10 obvious.

C. *Ground Based on Helbing*

Petitioner challenges claims 13 and 14 as anticipated under 35 U.S.C. § 102(b) by Helbing. Pet. 43–45.

Claims 13 and 14 read (some indentation and material in brackets added):

13. A material comprising a collection of loose matter and uncured or partially cured substantially formaldehyde free binder

[A] characterised in that the binder has a pH of greater than 6 when dissolved in water and

[B] comprises

[1] a reducing sugar, and

[2] at least 2.5% by dry weight with respect to the reducing sugar of an ammonium salt selected from the group consisting of

- [a] ammonium sulphate salts,
- [b] ammonium phosphate salts,
- [c] ammonium nitrate salts,
- [d] ammonium carbonate salts, and
- [e] combinations thereof.

14. The material of claim 13 in which the loose matter comprises mineral fibres.

i. Helbing

Helbing discloses “formaldehyde-free, thermally-curable, alkaline, aqueous binder compositions.” Ex. 1006, at [57]. Helbing describes compositions that are said to be useful “as a binder for non-woven fibers.” *Id.* at 6:16–17. One binder is described in Example 4.

EXAMPLE 4

To 3.1 g of a 14.5% solution of ELVANOL 51-05 (0.45 g) stirring at room temperature were added sequentially 54 g of a 14.2% solution of MOWIOL 4-98 (7.7 g), 58 g of a 30.6% solution of ammonium maleate (equivalent to 13.8 g of maleic acid solids), 1.7 g of maleinized soybean oil, 2.2 g of an 80% solution of corn syrup (1.8 g), 22.5 g of a 20% solution of ammonium sulfate (4.5 g), 0.6 g of 15 SILQUEST A-1101 silane, 58 g of soft water, and 36.5 g of a 19% solution of ammonia to produce approximately 237 g of solution. This solution exhibited a pH of 10.49, and consisted of approximately 25.2% MOWIOL 4-98, 1.5% ELVANOL 51-05, 45.2% maleic acid, 5.6% maleinized soybean oil, 5.9% corn syrup, 14.7% ammonium sulfate, and 2.0% SILQUEST A-1101 silane (as a relative percentage of 20 total dissolved solids), and contained about 13% dissolved solids (as a percentage of total weight of solution).

Id. at 13:9–21.

Dr. Hirsekorn opines that (1) corn syrup is a type of glucose syrup and (2) glucose is a reducing sugar. Ex. 1006 ¶ 132. Dr. Hirsekorn also states that Example 4 describes corn syrup as one ingredient. *Id.* ¶ 134.

According to Dr. Hirsekorn, the amount of ammonium sulfate salt in Example 4 is present in an amount that is 250% by dry weight with respect to the reducing sugar—a percentage above the “at least 2.5% by dry weight” of claim 13. *Id.* ¶ 135.

ii. Analysis

Petitioner points to Helbing’s disclosure of “where the pH of the binder composition is greater than about 7, and illustratively also less than or equal to about 10” to support its argument that Helbing discloses the claim 13 limitation “the binder has a pH of greater than 6 when dissolved in water.” Pet. 43–44 (citing Ex. 1005, 6:1–18). Petitioner also relies on Example 4, wherein Helbing discloses a binder solution having a pH of 10.49. *Id.* at 44 (citing Ex. 1005, 13:10–21). Petitioner relies on Example 4 and Dr. Helbing’s testimony to disclose the reducing sugar and ammonium salt limitations. *Id.* at 44–45. Petitioner relies on Helbing’s disclosure of fiberglass as disclosing the “mineral fibers” limitation of claim 14. *Id.* at 45.

Patent Owner argues that Helbing does not disclose each and every element of, or enable, the inventions of claims 13 and 14. PO Resp. 28. Specifically, Patent Owner argues, “[b]oth the plain language of claim 13 and the specification of the ‘210 Patent confirm that the limitation ‘the binder has a pH of greater than 6 when dissolved in water’ refers to a binder as applied to bind material that is subsequently dissolved into water.” *Id.* Helbing’s Example 4, Patent Owner argues, fails to teach this limitation

because it refers only to a solution not yet applied to any collection of the loose matter. *Id.* at 29.

Petitioner relies on the language of claim 13 (“A material comprising a collection of loose matter and uncured or partially cured substantially formaldehyde free binder characterised in that the binder has a pH of greater than 6 when dissolved in water and comprises”) to argue that there is no requirement that “the binder have a pH of greater than 6 when dissolved in water” *after* it has been applied to the loose matter, as Patent Owner contends. Reply 23–24. All that is required, Petitioner argues, is that the binder have “a pH of greater than 6 when dissolved in water.” *Id.* at 24. Petitioner argues that “the ’210 patent discloses 11 different sample binders whose pH’s were measured *prior to* application of the binder to loose matter.” *Id.* In sum, Petitioner replies that the language of claim 13 is “agnostic” as to whether the pH “has to be measured before, during, or after application to the loose material.” Tr. 24:18–21.

The language of claim 13 is not limiting in describing when the binder having a pH of greater than 6 is dissolved in water. It merely states that the binder has a pH of greater than 6 when dissolved in water. Helbing provides an example of a binder with a pH of greater than 6 when dissolved in water. Patent Owner’s reliance on one example given in the Specification attempts to import this limitation from the specification into claim 13. *CollegeNet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 1231 (Fed. Cir. 2005). Moreover, Patent Owner does not account for the remaining examples in the Specification, in which a pH of greater than 6 was measured just before mixing the binder with beads. Ex. 1001, 11:1–30. Reliance on one example from the Specification, without explaining why the remaining examples are

inapplicable, does not account adequately for the teachings of the remaining examples in the Specification. We are persuaded, on this record, that Helbing discloses a binder with a pH of greater than 6 when dissolved in water.

Patent Owner does not present separate arguments for claim 14. On the complete record before us, we are persuaded that Petitioner has shown by a preponderance of the evidence that claims 13 and 14 are anticipated by Helbing.

D. Testimony of Dr. Hirsekorn

Patent Owner argues that the Board “should afford little or no weight” to Dr. Hirsekorn’s “so-called *expert* opinions regarding refractory bricks such as those of Gogek,” because he is not an expert in refractory bricks. PO Resp. 25. Patent Owner faults Dr. Hirsekorn’s testimony regarding Gogek’s refractory bricks as conclusory, improper, and lacking explanation. *Id.* at 26–27.

Petitioner replies that Dr. Hirsekorn meets Petitioner’s proffered definition of one of ordinary skill in the art, which Patent Owner has not challenged. Reply 22. Petitioner proposed, in the Petition, that:

A person of ordinary skill in the art at the time of the earliest effective filing date of the ’210 Patent would have been someone with a Ph.D. in Chemistry and 3–5 years of industry experience in binder development for insulating or analogous products, or someone with a Bachelor’s degree in Chemistry or Chemical Engineering and 10 or more years of experience in binder development for the manufacture of insulating or analogous products. Ex. 1006, ¶ 47.

Pet. 6. Petitioner further replies that, as one of ordinary skill in the art and as an expert, Dr. Hirsekorn is qualified to offer expert testimony regarding the subject patent and the prior art. Reply 23.

We can accord appropriate weight to an expert's testimony, taking into account the expert's understanding of the level of skill in the art at the time of the invention. *See, e.g., Yorkey v. Diab*, 601 F.3d 1279, 1284 (Fed. Cir. 2010) (holding the Board has discretion to give more weight to one item of evidence over another "unless no reasonable trier of fact could have done so"). To testify as an expert under FRE 702, there need not be a perfect match between the expert's qualifications and the patent at issue. *See SEB S.A. v. Montgomery Ward & Co. Inc.*, 594 F.3d 1360, 1373 (Fed. Cir. 2010).

We agree with Petitioner that Dr. Hirsekorn is qualified to provide his opinions for this case. Reply 22–23. For example, Dr. Hirsekorn has a Bachelor's Degree in Chemistry from La Salle College, as well as a Doctorate Degree in Inorganic Chemistry from the University of Pennsylvania. Ex. 1006 ¶ 3. Dr. Hirsekorn has over thirty years of experience in the chemical industry, culminating in a position as Director of Technology for Coatings at Rohm and Hass Company, directing development of products for Architectural and Industrial Coatings, Building and Construction, and Textile and Non-Woven industries. *Id.* ¶ 4. Dr. Hirsekorn led an organization that developed binders for a wide variety of woven and non-woven products. *Id.* ¶ 6. Dr. Hirsekorn's qualifications align with the challenged subject sufficiently so that his knowledge is helpful in understanding the evidence and determining facts in issue.

We are not persuaded by Patent Owner's arguments that Dr. Hirsekorn's testimony as a whole should be given no weight. As noted

above, we have the discretion to determine the appropriate weight to be accorded to the evidence presented, including expert opinion, based on the disclosure of the underlying facts or data upon which the opinion is based. Moreover, as we have discussed, Dr. Hirsekorn qualifies as one of ordinary skill in the art under the definition proffered by Petitioner and not disputed by Patent Owner. We accord the appropriate weight to Dr. Hirsekorn's testimony as indicated in this Decision and for the reasons articulated in this Decision.

E. Motions to Exclude

Petitioner filed a Motion to Exclude (Paper 34), to which Patent Owner responded (Paper 39) and on which Petitioner filed a Reply (Paper 41). Petitioner's motion seeks to exclude Exhibits 2014 (Gogek file history), 2015 (Alavi Declaration), and 2023 (U.S. Pat. App. Pub. No. 2016/0002441) as irrelevant. Paper 34, 1–3. Patent Owner responds that Exhibits 2014 and 2015 are relevant, and that the Board specifically requested submission of Exhibit 2023. Paper 39, 1–6. Patent Owner also argues that Petitioner failed to file its objections to Patent Owner's evidence as required by 37 C.F.R. § 42.64(b)(1). *Id.* at 1–2. Petitioner replies that the failure to file was inadvertent, and that, as its objections were filed along with its Motion to Exclude, its error “is essentially harmless.” Paper 41, 1.

Petitioner must object timely to the evidence it seeks to exclude by filing its objections to evidence. 37 C.F.R. § 42.64(b)(1). Once an objection is filed, a motion to exclude “must be filed to preserve any objection.” *Id.* § 42.64(c). The motion to exclude must identify the prior objection. *Id.* There is no record that Petitioner timely filed its objections to Exhibits 2014,

2015, or 2023 prior to filing its Motion to Exclude, as required by Rule 42.64.

Even if we were to overlook Petitioner's error, we do not rely upon Exhibits 2014, 2015, or 2023 in our present determination. Petitioner's Motion to Exclude, therefore, need not be decided as to these Exhibits. Accordingly, Petitioner's Motion to Exclude is *dismissed* as moot as to Exhibits 2014, 2015, and 2023.

Patent Owner filed a Motion to Exclude (Paper 36), to which Petitioner responded (Paper 40) and on which Patent Owner filed a Reply (Paper 42). Patent Owner's motion seeks to exclude the entirety of the Hirsekorn Declaration, Exhibit 1006, as inadmissible, irrelevant, and lacking sufficient factual basis. Paper 37, 1–13; Paper 42, 1–4. Petitioner responds that all of the testimony in the Hirsekorn Declaration is relevant and helpful to the Board, and that Patent Owner's motion to exclude improperly argues the merits of Dr. Hirsekorn's testimony and not its admissibility. Paper 40, 2, 15.

Regarding Exhibit 1006, Patent Owner's reasons supporting its request to exclude the testimony of Dr. Hirsekorn go to the weight that should be given the testimony, not its admissibility. Paper 37, 1–13. We agree with Petitioner that we may consider Dr. Hirsekorn's testimony and accord it the proper weight. Accordingly, Patent Owner's Motion to Exclude is *denied* as to Exhibit 1006.

F. Motion to Seal

Patent Owner filed several exhibits (Exs. 2002–2008 and 2010–2013) under seal, along with a Motion to Seal (Paper 13), a Supplemental Brief on Motion to Seal (Paper 15) and a default protective order

(Ex. 2001). Patent Owner's Motion to Seal was unopposed. We previously granted Patent Owner's Motion to Seal, and approved the default protective order. Paper 16. In our order, we stated that if "at the end of the day neither party relies on the exhibits, they will be expunged thereby mooted any seal issue." *Id.* at 2.

There is an expectation that information will be made public where the information is identified in a final written decision, and that confidential information that is subject to a protective order ordinarily would become public 45 days after final judgment in a trial, unless a motion to expunge is granted. 37 C.F.R. § 42.56; Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,761 (Aug. 14, 2012). In rendering this Final Written Decision, it was not necessary to identify, or discuss in detail, any confidential information. However, a party who is dissatisfied with this Final Written Decision may appeal the Decision pursuant to 35 U.S.C. § 141(c), and has 63 days after the date of this Decision to file a notice of appeal. 37 C.F.R. § 90.3(a). Thus, it remains necessary to maintain the record, as is, until resolution of an appeal, if any.

In view of the foregoing, the confidential documents filed in the instant proceeding will remain under seal, at least until the time period for filing a notice of appeal has expired or, if an appeal is taken, the appeal process has concluded. The record for the instant proceeding will be preserved in its entirety, and the confidential documents will not be expunged or made public, pending appeal. Notwithstanding 37 C.F.R. § 42.56 and the Office Patent Trial Practice Guide, neither a motion to expunge confidential documents nor a motion to maintain these documents under seal is necessary or authorized at this time. *See* 37 C.F.R. § 42.5(b).

At the conclusion of these proceedings, including any appeal or expiration of an appropriate period to appeal, Patent Owner should initiate a conference call with the Board in a timely fashion to prevent inadvertent unsealing.

G. Conclusion

For the foregoing reasons, after considering the Petition, Patent Owner Response, Reply, and all evidence relied upon by Petitioner and Patent Owner, we are persuaded that Petitioner has shown by a preponderance of the evidence that claims 1, 2, 6, 8, 10, 13, and 14 are unpatentable.

III. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that claims 1, 2, 6, 8, 10, 13, and 14 are held unpatentable;

ORDERED that Petitioner's Motion to Exclude is dismissed as moot as to Exhibits 2014, 2015, and 2023;

ORDERED that Patent Owner's Motion to Exclude is denied as to Exhibit 1006; and

FURTHER ORDERED that because this is a final written decision, 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.

IPR2015-01402
Patent 8,114,210 B2

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