

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GAF MATERIALS LLC,
Petitioner,

v.

KIRSCH RESEARCH AND DEVELOPMENT, LLC,
Patent Owner.

IPR2021-00192
Patent 6,308,482 B1

Before CHARLES J. BOUDREAU, JOHN D. HAMANN, and
AARON W. MOORE, *Administrative Patent Judges*.

BOUDREAU, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

GAF Materials LLC (“GAF” or “Petitioner”) filed a Petition for *inter partes* review of claims 1–34 (“the challenged claims”) of U.S. Patent No. 6,308,482 B1 (Ex. 1001, “the ’482 patent”). Paper 1 (“Pet.”). Kirsch Research and Development, LLC (“Kirsch” or “Patent Owner”) filed a Preliminary Response. Paper 13 (“Prelim. Resp.”).

On May 25, 2021, we instituted an *inter partes* review of the challenged claims. Paper 14 (“Inst. Dec.”). Patent Owner then filed a Patent Owner Response (Paper 18, “PO Resp.”), Petitioner filed a Reply (Paper 24, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 26, “PO Sur-reply”). With the Board’s authorization, Petitioner then filed a Sur-sur-reply (Paper 27, “Pet. Sur-sur-reply”) and Patent Owner filed a Sur-sur-sur-reply (Paper 31, “PO Sur-sur-sur-reply”). Petitioner also filed a Motion to Exclude (Paper 34, “Mot. Excl.”), in response to which Patent Owner filed an Opposition (Paper 36, “Opp. Mot. Excl.”), and Petitioner filed a Reply (Paper 37, “Reply Mot. Excl.”).

An oral hearing was held on March 22, 2022, and a transcript of the hearing is included in the record. Paper 43 (“Tr.”).

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons that follow, we determine that Petitioner has shown by a preponderance of the evidence that all challenged claims are unpatentable.

II. BACKGROUND

A. *Real Parties in Interest*

Petitioner and Patent Owner identify themselves as the real parties in interest. Pet. 72; Paper 11, 1 (Patent Owner’s Updated Mandatory Notices).

B. Related Matters

The parties identify thirteen district court actions involving the '482 patent, including, among others, *Kirsch Research & Development, LLC v. GAF Materials LLC*, 2:20-cv-13683 (D.N.J.), in which Petitioner is named as a defendant. Pet. 72; Paper 11, 1–2.

The '482 patent was also the subject of *Owens Corning Roofing & Asphalt, LLC v. Kirsch Research & Development, LLC*, IPR2020-01389, in which an *inter partes* review was instituted on February 18, 2021, and terminated on November 15, 2021, due to settlement; *Atlas Roofing Corp. v. Kirsch Research & Development, LLC*, IPR2021-01181, and *Epilay, Inc. v. Kirsch Research & Development, LLC*, IPR2021-01183, both of which settled prior to institution of trial; and *IKO Industries, Inc. v. Kirsch Research & Development, LLC*, IPR2022-00416, in which *inter partes* review was denied on May 20, 2022. IPR2020-01389, Papers 11, 32; IPR2021-01181, Paper 10; IPR2021-01183, Paper 11; IPR2022-00416, Paper 9.

C. The '482 Patent

The '482 patent, titled “Reinforced Roof Underlayment and Method of Making the Same,” is directed to a “reinforced roofing underlayment positioned between a roof support structure and an overlayment in order to provide a waterproof barrier for the roof structure.” Ex. 1001, codes (54), (57). The underlayment includes “an interwoven scrim comprising a mesh of interwoven strands of thermoplastic having a tensile strength sufficient to resist tearing when exposed to tensile loads from various directions.” *Id.* at code (57). Figure 1 of the '482 patent is reproduced below.

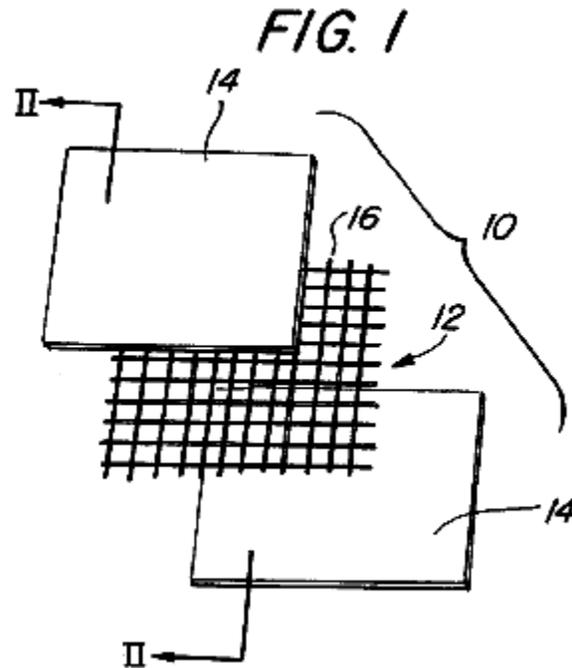


Figure 1, shown above, is an exploded perspective view of a preferred embodiment of the reinforced roofing underlayment of the '482 patent. Ex. 1001, 3:7-9. With reference to Figure 1, the '482 patent explains that underlayment 10 includes reinforcing scrim 12 having layers of waterproof thermoplastic material 14 preferably affixed to both sides. *Id.* at 3:38-45. The '482 patent further explains that reinforcing scrim 12 is formed of a mesh of individual interwoven strands 16, preferably formed of a thermoplastic polymer such as polypropylene, polyethylene, polyester, nylon, "or other similar material." *Id.* at 3:45-52. A cross-sectional view of underlayment 10 of Figure 1 is shown in Figure 2 of the '482 patent, reproduced below.

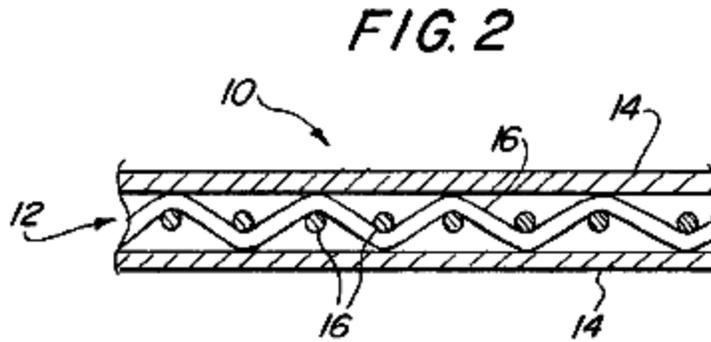


Figure 2, shown above, is an enlarged fragmentary cross-sectional view taken generally along lines II—II of Figure 1. *Id.* at 3:10–12. According to the '482 patent, Figure 2 provides an example of how strands 16 are “interwoven together . . . to provide a reinforcing scrim 12 having an improved tensile strength not achievable with a solid film of material, where the orientation of the thermoplastic strands 16 may be selected to optimize their tensile strength.” *Id.* at 3:52–57. The '482 patent further explains that “strands 16 may comprise any cross-sectional shape and size, depending upon the desired tensile characteristics of the scrim 12.” *Id.* at 3:57–59.

Another preferred embodiment of the '482 patent is illustrated in Figure 3, reproduced below.

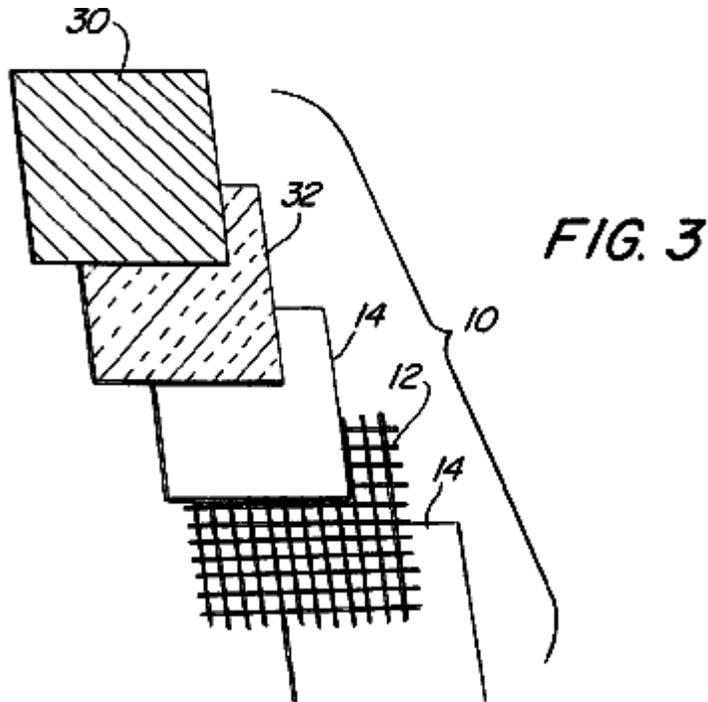


Figure 3, shown above, is an exploded perspective view of a different preferred embodiment of the reinforced roofing underlayment of the '482 patent. Ex. 1001, 3:13–15. With reference to Figure 3, underlayment 10 may further include slip-resistant surface 30, preferably formed of a sheet of woven polypropylene, and radiant barrier layer 32, preferably comprising a metalized layer such as a layer of aluminum foil, which serves “to reflect solar energy and thereby reduce the transmission of radiant heat through . . . underlayment 10.” *Id.* at 4:23–38. According to the '482 patent, radiant barrier layer 32 may be affixed to underlayment 10 “in any number of manners” and “may be positioned at any point within the arrangement of layers in the roofing underlayment 10 other than in between the two thermoplastic layers 14.” *Id.* at 4:38–47.

D. Illustrative Claims

Of the challenged claims, claims 1, 21, and 34 are independent. Challenged claims 2–20 depend directly or indirectly from claim 1, and

challenged claims 22–33 depend directly or indirectly from claim 21.

Independent claims 1, 21, and 34 are illustrative and are reproduced below:

1. A roofing underlayment positioned between a roof support structure and an overlayment, comprising:
 - a reinforcing scrim of interwoven strands for supporting tensile forces in multiple directions, and
 - at least one layer of thermoplastic material affixed to a side of the reinforcing scrim by extrusion lamination for providing a weather-resistant barrier.

21. A multi-layer waterproofing membrane for providing a weather-resistant barrier, comprising:
 - a reinforcing scrim of cross-laminated thermoplastic strands for supporting tensile forces in multiple directions, and
 - a layer of thermoplastic material extruded to cover each side of the reinforcing scrim, wherein the thermoplastic material provides a waterproof barrier,wherein the waterproofing membrane is positioned between a roof support structure and an overlayment.

34. A roofing underlayment positioned between a roof support structure and an overlayment, comprising:
 - a reinforcing scrim of interwoven strands for supporting tensile forces in multiple directions, and
 - at least one layer of thermoplastic material affixed to a side of the reinforcing scrim for providing a weather-resistant barrier,wherein the thermoplastic layer includes micro-perforations which allow the passage of air therethrough while preventing moisture from passing therethrough.

Ex. 1001, 6:21–27, 7:15–24, 8:26–36.

E. Instituted Grounds of Unpatentability

Petitioner asserted, and we instituted *inter partes* review on, the following grounds of unpatentability:

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
1, 8–12, 19	102(b)	Lou ²
2, 3	103(a)	Lou, Büsscher ³
4–6, 18	103(a)	Lou, Simpson ⁴
7, 15, 16	103(a)	Lou, Ellison ⁵
13, 14, 17	103(a)	Lou, Goodacre ⁶
20, 34 ⁷	103(a)	Lou, Curran ⁸
21, 27–32	103(a)	Lou, Goodacre, Ellison
22, 23	103(a)	Lou, Goodacre, Ellison, Büsscher

¹ The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013. Because the ’482 patent issued from an application filed before March 16, 2013, we apply the pre-AIA versions of the statutory bases for unpatentability.

² Lou, US 4,684,568, issued August 4, 1987 (Ex. 1005).

³ Büsscher & Hoffmann GmbH, AT 001 731 U2, published October 27, 1997 (Ex. 1007; English translation filed as Ex. 1008).

⁴ Simpson et al., US 5,142,837, issued September 1, 1992 (Ex. 1009).

⁵ Ellison, US 4,615,934, issued October 7, 1986 (Ex. 1010).

⁶ Goodacre et al., US 4,656,082, issued April 7, 1987 (Ex. 1011).

⁷ As recognized by Patent Owner (Prelim. Resp. 2 n.1), Petitioner did not indicate that claim 34 is challenged over Lou and Curran in its summary table of grounds at page 20 of the Petition but included both claims 20 and 34 in the subheading and discussion of that ground at pages 38–40 of the Petition.

⁸ Curran, US 5,291,712, issued March 8, 1994 (Ex. 1012).

Claim(s) Challenged	35 U.S.C. §¹	Reference(s)/Basis
24–26, 33	103(a)	Lou, Goodacre, Ellison, Simpson
1–12, 15, 16, 18	102(b)	Howells ⁹
13, 14, 17, 21, 27–32	103(a)	Howells, Goodacre
19, 20, 34	103(a)	Howells, Curran
22, 23	103(a)	Howells, Goodacre, Büsscher
24–26, 33	103(a)	Howells, Goodacre, Simpson

Pet. 20–72; Inst. Dec. 8–9, 46. Petitioner also relies on a declaration of Richard T. Kaczkowski, P.E., S.E. (Ex. 1003) in support of its arguments. Patent Owner relies on a declaration of Charles Daniels, Ph.D. (Ex. 2021) in support of its arguments.

III. DISCUSSION

A. *Legal Framework*

In an *inter partes* review, the petitioner has the burden of proving unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e). That burden never shifts to the patentee. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015).

A claim is anticipated under 35 U.S.C. § 102 “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). Moreover,

unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited

⁹ Howells, WO 96/26067, published August 29, 1996 (Ex. 1006).

in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. § 102.

Net MoneyIN, Inc. v. VeriSign, Inc., 545 F.3d 1359, 1371 (Fed. Cir. 2008);
accord In re Arkley, 455 F.2d 586, 587 (CCPA 1972).

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter 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 legal 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 skill in the art; and (4) when in evidence, objective evidence of obviousness or nonobviousness, i.e., secondary considerations.¹⁰ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). One seeking to establish obviousness based on more than one reference also must articulate sufficient reasoning with rational underpinnings to combine teachings. *See KSR*, 550 U.S. at 418.

We analyze the asserted grounds with the principles stated above in mind.

B. Level of Skill in the Art

Citing the testimony of Mr. Kaczowski, Petitioner proposes:

A person of ordinary skill in the art for the ’482 patent is someone having at least a bachelor’s degree in civil engineering, chemical engineering, chemistry, materials engineering, textile engineering, or materials science; or at least three years of work

¹⁰ The record does not include allegations or evidence of objective indicia of obviousness or nonobviousness.

experience designing, manufacturing, and/or installing roofing underlayments or similar products for construction applications; or equivalent education or experience.

Pet. 9 (citing Ex. 1003 ¶ 57). Patent Owner does not contest the level of ordinary skill in the art. *See generally* PO Resp. Our findings and conclusions in this Decision do not turn on selecting a particular definition for the level of ordinary skill in the art. Nonetheless, we determine that the level of ordinary skill proposed by Petitioner is consistent with the '482 patent and the asserted prior art. As such, we adopt Petitioner's proposal for purposes of this Decision.

C. Claim Construction

In interpreting the claims of the '482 patent, we “us[e] the same claim construction standard that would be used to construe the claim[s] in a civil action under 35 U.S.C. [§] 282(b).” *See* 37 C.F.R. § 42.100(b) (2020). The claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc) is applicable. Claim terms are generally given their ordinary and customary meaning as would be understood by one with ordinary skill in the art in the context of the specification, the prosecution history, other claims, and even extrinsic evidence including expert and inventor testimony, dictionaries, and learned treatises, although extrinsic evidence is less significant than the intrinsic record. *Phillips*, 415 F.3d at 1312–17. The specification may reveal a special definition given to a claim term by the patentee, or the specification or prosecution history may reveal an intentional disclaimer or disavowal of claim scope by the inventor. *Id.* at 1316. If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification “with reasonable clarity, deliberateness, and precision.” *Renishaw PLC v. Marposs Societa' per*

Azioni, 158 F.3d 1243, 1249 (Fed. Cir. 1998). The disavowal, if any, “can be effectuated by language in the specification or the prosecution history.” *Poly-Am., L.P. v. API Indus., Inc.*, 839 F.3d 1131, 1136 (Fed. Cir. 2016). Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Neither Petitioner nor Patent Owner proposed any terms for express construction in its briefing. Nonetheless, Patent Owner contends that Petitioner improperly interprets independent claims 1 and 21 and dependent claim 16 as product-by-process claims in its application of the prior art to the claims, and thereby presents an implied issue of claim construction. *See* PO Resp. 10–13.

In particular, the Petition asserts that claim 1 “requires the process/method step of affixing thermoplastic material ‘to a side of the reinforcing scrim by extrusion lamination,’ which would not have been expected to impart any distinctive structural or functional characteristics to the final underlayment product,” and that “[i]n order to render this product-by-process claim unpatentable, the prior art need not teach any of the claimed method steps.” Pet. 22 (citing Ex. 1003 ¶ 19). With respect to claim 21, the Petition similarly asserts that “[a]lthough this claim is directed to a product (*i.e.*, a ‘waterproofing membrane’), requiring that the thermoplastic material be ‘extruded to cover each side of the reinforcing scrim’ is a process limitation that would not have been expected to impart any distinctive structural or functional characteristics to the final underlayment product,” and that “the method steps in this product-by-

process claim need not be disclosed in the prior art to render [the] claim unpatentable.” *Id.* at 42 (citing Ex. 1003 ¶ 19; *Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1354 (Fed. Cir. 2016)). Referring to the recitation in claim 16 that “the thermoplastic layers are ‘co-extruded over both sides of the reinforcing scrim,’” the Petition asserts that “[t]his is a product-by-process claim with a method step (co-extrusion) that would not have been expected to impart any distinctive structural or functional characteristics to the final underlayment product, and thus need not be disclosed in the prior art.” *Id.* at 32 (citing Ex. 1003 ¶ 19; *Purdue Pharma*, 811 F.3d at 1354).

In response, Patent Owner contends that “[i]n all three instances, the Petition is wrong” and that “[t]he above limitations in claims 1, 16, and 21 connote structure, as they describe the structural relationship between the reinforcing scrim and the thermoplastic material.” PO Resp. 10–11. According to Patent Owner, “[t]he limitation in claim 1 is directed to products made with a laminating process, while claim 21 is broad enough to cover products made by both laminating and coating process, which are different processes”; “[t]he limitation in claim 16 covers co-extrusion process[es]”; and “[t]he resulting products have different structures.” *Id.* at 11. Patent Owner further contends that “extrusion lamination is not a process limitation because a product made by extrusion lamination exhibits particular structural features, such as superior bonding of the layers, not imbued by other processes (such as the calendering discussed in the file history that uses hydraulic heat and pressure to join layer together, rather than an extruded, molten polymer).” *Id.*

Further, according to Patent Owner, its contention that the referenced claim limitations connote structural characteristics is consistent with the

analysis in a claim construction order from a litigation in the U.S. District Court for the Eastern District of Texas, “which found that ‘extrusion lamination’ is not a product-by-process limitation.” PO Resp. 13 (citing Ex. 2025,¹¹ 66–67). Still further, Patent Owner argues, its contention that the recitation of “at least one layer of thermoplastic material affixed to a side of the reinforcing scrim by extrusion lamination for providing a weather-resistant barrier” in claim 1 is “*not* a product-by-process element . . . is consistent with analysis performed by Petitioner expert, Mr. Kaczkowski, who does not mention that the claim 1 is a ‘product-by-process.’” *Id.* at 19 (citing Ex. 1003 ¶ 64).

According to Patent Owner, “[a]lthough Petitioner and Mr. Kaczkowski do not offer any claim constructions in this IPR, it is clear that both have a different definition of ‘extrusion lamination’ than how a [person of ordinary skill in the art] would understand the term.” PO Resp. 19–20 (citing Ex. 2021 ¶ 65). In particular, Patent Owner argues, “Petitioner and its expert seem to consider ‘extrusion coating’ and ‘extrusion lamination’ as different terms for the same process,” but “[t]his is wrong.” *Id.* at 20 (citing Ex. 2021 ¶ 66; Ex. 2020 (Mr. Kaczkowski’s deposition transcript), 25:16–22, 28:4–9). According to Patent Owner, “[e]xtrusion coating,’ as the name implies, involves coating a surface with a polymer that

¹¹ Notwithstanding Patent Owner’s citation of Exhibit 2025, which consists of two brief excerpts from the August 9, 2021, Opening Expert Report of Maureen T.F. Reitman, Sc.D., P.E. on Invalidity of U.S. Patent No. 6,308,482 from *Kirsch Research & Development, LLC v. DuPont de Nemours, Inc.*, No. 5:20-cv-00057 (E.D. Tex.) and does not include any pages numbered 66 or 67, we understand Patent Owner citation to refer instead to Exhibit 2023, which is a claim construction order from that same case.

is extruded,” whereas “[e]xtrusion lamination[]’ . . . is very different.” *Id.* at 20–21 (citing Ex. 2021 ¶¶ 67–68). In support of its arguments, Patent Owner cites definitions of “coated fabric” and “laminated fabric” from a textile dictionary, from which, Patent Owner contends, a person of ordinary skill in the art “would have understood the plain and ordinary meaning of ‘extrusion lamination’ in the context of claim 1 of the ’482 patent, to be the specific process that uses both extrusion and pressing to laminate two layers together using the polymer melt as a binder.” *Id.* (citing Ex. 1017, 8 (defining “coated fabric” as “a flexible material composed of a fabric and any adherent polymeric material applied to one or both surfaces”), 24 (defining “laminated fabric” as “a flexible fabric system composed of superimposed layers of fabric firmly united by bonding or impregnating with an adherent polymeric material to one or more surfaces”)). Patent Owner also cites testimony of Dr. Reitman, a witness retained by defendants in litigation that does not involve Petitioner, who Patent Owner contends “recognized” that a person of ordinary skill in the art “would understand ‘extrusion coating’ to be different than ‘extrusion lamination.’” *Id.* at 21–22 (citing Ex. 2021 ¶ 69; Ex. 2025 ¶ 54).¹²

Further, Patent Owner contends, a person of ordinary skill in the art would have known that “a key feature of thermoplastic polymers is the ability to melt and transform from a solid into a liquid or molten polymer,” which can be extruded through a die and then, after the extruded polymer is formed into its desired shape and form, the polymer melt is can be cooled and solidified into a rigid part. PO Resp. 22. Patent Owner argues,

¹² As detailed in Section III.G below, we grant Petitioner’s motion to exclude Dr. Reitman’s testimony.

“[e]xtrusion lamination, in particular, can use this feature of thermoplastic polymers to join (referred to in the art as ‘laminating’) different structures together.” *Id.* For example, Patent Owner argues, “in the context of the claims of the ’482 patent, the polymer melt is used to laminate the reinforcing scrim with a top layer (such as a slip-resistant material discussed in claim 2, or a metallized layer, or any other top layer chosen by a manufacturer),” and “[t]his process is known as extrusion lamination since the molten polymer is extruded and subsequently used to laminate the other layers together.” *Id.* at 23. According to Patent Owner, “[n]othing in the intrinsic evidence alters the plain and ordinary meaning of extrusion lamination,” and “this is consistent with the prosecution history of the ’482 patent.” *Id.* For example, Patent Owner argues, “[d]uring prosecution, . . . the inventor distinguished a disclosure of a rubber mill calendering process” in which “layers are joined together simply by heat and pressure from calendering rollers.” *Id.* at 23–24 (citing Ex. 1002, 71).

Finally, Patent Owner alleges, “[i]n view of the totality of the evidence, a [person of ordinary skill in the art], in the context of the ’482 patent, would understand the court’s construction [in *Kirsch Research & Development, LLC v. DuPont de Nemours, Inc.*, No. 5:20-cv-00057 (E.D. Tex.)] of ‘extrusion lamination’ ([‘]by being melted in an extruder, and forced onto the reinforcing scrim through a die extruder’) to be directed toward the specific process that used both extrusion and pressing to laminate two layers together using the polymer melt as a binder.” PO Resp. 25 (citing Ex. 2021 ¶ 75).

In its Reply, Petitioner argues that, although the Patent Owner Response “makes much of an alleged disagreement over the plain and ordinary meaning of ‘extrusion lamination,’ . . . both Mr. Kaczkowski and

Dr. Daniels applied essentially the same interpretation of ‘extrusion lamination.’” Pet. Reply 2–3. According to Petitioner, Patent Owner’s alleged distinction between “extrusion coating” and “extrusion lamination” “is a strawman argument” because “the experts agree on what process steps are necessary for a reference to teach ‘extrusion lamination.’” *Id.* at 3. In particular, Petitioner contends Patent Owner’s expert Dr. Daniels testified that a person of ordinary skill in the art “would understand the plain and ordinary meaning of ‘extrusion lamination,’ in the context of claim 1 of the ’482 patent, to be the specific process that uses both extrusion and pressing to laminate two layers together using the polymer melt as a binder,” and he “clarified that when he refers to laminating ‘two layers together using the polymer melt as a binder,’ those two layers ‘could, for instance, be a scrim and a . . . layer of extruded polypropylene,’ i.e., the process could result in a two-layer product.” *Id.* (footnote omitted) (citing Ex. 2021 ¶ 68; Ex. 1022 (Dr. Daniels’ deposition transcript), 8:16–24).

Further, Petitioner contends, “Dr. Daniels’ interpretation of this term is nearly identical to Mr. Kaczowski’s, which Kirsch quoted in its Response: ‘extruding material, the extrudate, applying that onto one or more layers of substrate, and in that process binding at least the extrudate to that substrate . . . through some combination of heat and/or pressure.’” *Id.* at 4 (quoting PO Resp. 20 (quoting Ex. 2020 (Mr. Kaczowski’s deposition transcript), 25:16–22)). Petitioner argues that, contrary to Patent Owner’s argument, “Mr. Kaczowski never testified that ‘extrusion coating’ and ‘extrusion lamination’ are necessarily synonymous,” but instead testified more specifically that “[a] coating process *which results in the binding of the extruded material to the substrate* would be considered by a person of ordinary skill in the art to be an extrusion lamination process” and that “what

a [person of ordinary skill in the art] might call ‘extrusion coating’ would also be considered ‘extrusion lamination’ if it ‘results in the extrudate *being permanently bonded* to the substrate.’ *Id.* at 5 (quoting Ex. 2020, 43:5–14, 28:10–20). Finally, Petitioner argues that “any potential semantic distinction between ‘extrusion coating’ and ‘extrusion lamination’ is irrelevant, because the experts agree on how extrusion lamination is defined” in terms of requiring “extruding an extrudate/polymer melt,” “binding that extrudate/polymer melt to at least a substrate/other layer,” and “through at least the act of pressing.” *Id.* at 4, 6.

Patent Owner responds in its Sur-reply that “Petitioner . . . wrongly asserts that ‘Dr. Daniels clarified that when he refers to laminating “two layers together using the polymer melt as a binder,” these two layers “could, for instance, be a scrim and a . . . layer of extruded polypropylene,” i.e., the process could result in a two-layer product.[’]” PO Sur-reply 2 (citing Ex. 1022, 9:7–16). According to Patent Owner:

Looking at the entirety of what Dr. Daniels stated at page 9, lines 7–16 reveals his testimony is actually quite different:

Q: Under the Definition that you set forth in Paragraph 68 of your declaration, you refer to “laminates two layers together.” That's correct, right? 09:08:12

A: Well, at least two layers, but, yes. Yes.

Q: And those “at least two layers” could, for instance, be a scrim and a slip-resistant layer of extruded polypropylene?

A Well, it certainly can be those two layers, and it can be others as the construction calls for.

Ex. 1022 at 9:7–16. Despite their representations to the contrary, Dr. Daniels is not testifying that the thermoplastic material used in the process of extrusion lamination is also one of the layers. Rather, Dr. Daniels is testifying that two different layers, a scrim and a slip-resistant layer of extruded polypropylene, could be joined by extrusion lamination using a binder of a thermoplastic material. That is, the thermoplastic material would be located between and would bind the scrim and the slip-resistant layer together. This is consistent with Dr. Daniels’ description of how a [person of ordinary skill in the art] would understand the term “extrusion lamination.”

Moreover, this is also consistent with the entirety of Dr. Daniels’ opinions throughout this proceeding. Dr. Daniels’ use of the plain and ordinary meaning of the term “extrusion lamination” and how he applies it to the prior art has been constant. . . .

. . . .

Dr. Daniels’ understanding of “extrusion lamination” is also very different than that allegedly provided by Mr. Kaczkowski, which is essentially extrusion coating. [Pet.] Reply at 4. But as set forth in great detail in Patent Owner’s Response, extrusion coating is not “extrusion lamination.” PO [Resp.] 19–27. Moreover, a mere statement that the two experts “effectively agree on the meaning of ‘extrusion lamination’” requires mischaracterizing Dr. Daniels’ testimony. [Pet.] Reply at 4.

Id. at 2–4. Patent Owner further contends that Mr. Kaczkowski’s “position that ‘extrusion coating’ would also be considered ‘extrusion lamination’ if it ‘results in the extrudate being permanently bonded to the substrate’” “is nothing more than restatement of the extrusion coating process,” and “[t]o think otherwise would require believing that ‘extrusion coating’ involves a thermoplastic layer that is extruded, and thus coated, onto a substrate with the result being that it is not permanently bonded, *i.e.*, it will delaminate from the substrate.” *Id.* at 5 (citing Pet. Reply 5). According to Patent

Owner, “[s]uch a product makes no sense” and “[u]nder Petitioner’s theories, the [prior art] would not work.” *Id.*

Having fully considered the parties’ arguments, we disagree, as an initial matter, with Petitioner’s contention that claims 1, 16, and 21 are product-by-process claims, consistent with the claim construction orders entered by the U.S. District Court for the Eastern District of Texas in *Kirsch Research & Development, LLC v. DuPont de Nemours, Inc.*, No. 5:20-cv-00057 (Ex. 2023 (“EDTX Claim Construction Order”), 62–67) and the U.S. District Court for the Western District of Texas in *Kirsch Research & Development, LLC v. IKO Industries, Inc.*, No. 6:20-cv-317 (Ex. 2026, 3). We further disagree, however, with Patent Owner’s contention that the recitation in claim 1 of “extrusion lamination” requires that the recited roofing underlayment must include an additional layer besides the scrim and the thermoplastic material, where the recited thermoplastic material serves merely as a binder to join two other layers.

We begin our analysis with the language of the claims. *See Phillips*, 415 F.3d at 1314. To be sure, claim 1 does not exclude the presence of additional layers in the roofing underlayment. Indeed, claim 1 recites “at least one” layer of thermoplastic material, and dependent claims 2 and 4 expressly require that the roofing underlayment further comprises “a layer of slip-resistant material positioned over an outer surface of the roofing underlayment” and “a radiant barrier layer for reflecting solar energy positioned adjacent the layer of thermoplastic material,” respectively. But we find nothing in the language of the claims or in the specification of the ’482 patent that *requires* claim 1 to include such additional layer, either expressly or impliedly. And although claims 2 and 4 do require additional layers, neither of those claims recites that the layer of thermoplastic material

necessarily serves as a binder to join those additional layers to the scrim. Rather, claim 2 recites only that the layer of slip-resistant material be “positioned over an outer surface of the roofing underlayment” and claim 4 recites only that the radiant barrier layer be “positioned adjacent the layer of thermoplastic material.”

Unlike claim 1, which requires that the thermoplastic material be “affixed to a side of the reinforcing scrim by extrusion lamination,” neither claim 2 nor claim 4 specifies the manner in which the respectively recited additional layers are “positioned over an outer surface” of the underlayment or “positioned adjacent the layer of thermoplastic material.” Accordingly, we are not persuaded by Patent Owner’s contention that “the thermoplastic material would be located between and would bind the scrim and the slip-resistant layer together.” Claim 1 does not recite a “slip-resistant layer.” If we were nonetheless to read claim 1 as implicitly requiring an unrecited “slip-resistant layer,” claim 2 “further comprising a layer of slip-resistant material positioned over an outer surface of the roofing underlayment” would make little sense.

We look next to the specification and prosecution history of the ’482 patent. *See Phillips*, 415 F.3d at 1315–17. The term “extrusion lamination” does not appear anywhere in the ’482 patent outside of issued claim 1, but our understanding is supported by the prosecution history of the ’482 patent. Claim 1 as originally filed in the application that issued as the ’482 patent recited, in relevant part, “a reinforcing scrim of interwoven strands for supporting tensile forces in multiple directions; and at least one layer of thermoplastic material affixed to a side of the reinforcing scrim for providing a weather-resistant barrier.” Ex. 1002 (’482 patent prosecution history), 33. In response to a rejection of the claims as anticipated by U.S.

Patent No. 5,523,357 to Peterson, describing a rubber mill calendering process, the applicant amended claim 1 to add the phrase “by extrusion lamination.” *Id.* at 71, 76. We find nothing to suggest that a person of ordinary skill in the art would have understood that amendment to add a requirement of an additional layer of thermoplastic material, separate and apart from the “at least one layer of thermoplastic material” already recited in the original claim, to serve as a binder between the scrim and the original layer of thermoplastic material. The applicant explained in remarks accompanying the amendment, “Peterson fails to disclose forming a thermoplastic layer over the reinforcing scrim by an extrusion lamination process.” *Id.* at 71 (italics, underlining, and capitalization omitted). We, thus, find that the added phrase specifies *how* the recited “thermoplastic material” must be “affixed” to “the side of the reinforcing scrim,” but does not alter the recited function of the thermoplastic material, namely, “for providing a weather-resistant barrier.” Although the applicant’s remarks further state that “[c]ontrarily [to the rubber mill calendering process of Peterson], the roofing underlayment of the present invention is formed by an extrusion lamination process which bonds the various layers together, including the pre-formed films, reinforcement scrim, and slip-resistant material” (*id.*), claim 1 does not recite “pre-formed films” or “slip-resistant material”; such additional layers are recited in dependent claims 5 (“metallized film”) and 2 (“layer of slip-resistant material”), respectively (Ex. 1001, 6:29, 6:37).

Looking finally to the extrinsic evidence of record, including the testimony of the parties’ experts and other exhibits filed by the parties, we find no persuasive evidence to show that the recitation of extrusion lamination requires an additional layer in addition to the recited scrim and

the at least one layer of thermoplastic material affixed to a side of the scrim. In that regard, notwithstanding Patent Owner's contentions, we are not persuaded that "extrusion lamination" and "extrusion coating" are mutually exclusive. Rather, we credit Mr. Kaczkowski's testimony that extrusion coating would also be considered "extrusion lamination" if, for example, it "results in the extrudate being permanently bonded to the substrate."

Ex. 2020, 28:17–20. While Patent Owner argues that Mr. Kaczkowski's statement "is nothing more than restatement of the extrusion coating process," and "[t]o think otherwise would require believing that 'extrusion coating' involves a thermoplastic layer that is extruded, and thus coated, onto a substrate with the result being that it is not permanently bonded, *i.e.*, it will delaminate from the substrate" (PO Sur-reply 5), we disagree with Patent Owner's further contentions that "[s]uch a product makes no sense" and "[u]nder Petitioner's theories, the [prior art] would not work" (*id.*).

Although there could indeed be extrusion coating processes that would result in coatings that are not permanently bonded, it does not follow that the cited prior art used such processes. Further, although a laminate *may* be affixed to substrate by an adhesive or other binder, we find no persuasive evidence in the record that the binder must be a separate layer from the laminate.

Finally, we note that our determination is consistent with the EDTX Claim Construction Order, which rejected the proposal of the defendants in that case to interpret "by extrusion lamination" as a product-by-process limitation and instead construed that phrase to mean "by being melted in an extruder, and forced onto the reinforcing scrim through a die of the extruder." Ex. 2023, 67 (emphasis omitted). Although that construction excludes processes that do not involve extrusion of a molten polymer, consistent with Patent Owner's argument in its Response that a product

made by extrusion lamination exhibits particular structural features not imbued by processes “such as the calendering discussed in the file history that uses hydraulic heat and pressure to join layer together, rather than an extruded, molten polymer” (PO Resp. 11), the construction does not exclude extrusion coating.

D. The Prior Art

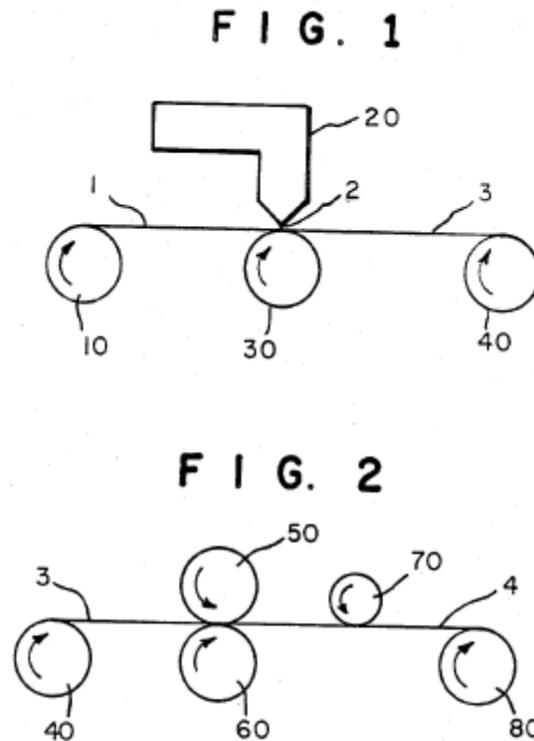
Before turning to Petitioner’s asserted grounds of unpatentability, we provide a brief summary of the asserted references.

1. Lou

Lou, titled “Vapor-Permeable Liquid-Impermeable Fabric,” describes a process for making a water-impermeable, vapor-permeable fabric “particularly suited for use as a roofing-tile underlayment or as an air-infiltration barrier.” Ex. 1005, codes (54), (57). Lou explains that breathable fabrics (i.e., fabrics that are vapor-permeable yet water-impermeable) have transmission and barrier characteristics suitable for “building construction, for example as a roofing-tile underlayment (i.e., ‘underslayment’),” but that prior art materials “exhibited shortcomings in their combination of strength, barrier and transmission properties” when used as roofing tile underlayments or air-infiltration barriers. *Id.* at 1:19–20, 1:32–36. Lou accordingly discloses that the object of its invention “is to provide a process for making a coated fabric . . . suitable for use as an air-infiltration barrier or as a roofing-tile underlayment.” *Id.* at 1:37–40. In furtherance of that objective, the process “includes the steps of applying a continuous coating of polypropylene to a surface of a vapor-and-liquid permeable, base sheet of synthetic organic fibers and then calendering the coated surface.” *Id.* at 1:44–49. According to Lou, the coating step, which is preferably carried out by extrusion coating, renders the sheet impermeable

to water and vapor, while the calendering step provides vapor permeability to the sheet while maintaining liquid water impermeability. *Id.* at code (57), 1:9–13.

Figures 1 and 2 of Lou are reproduced below.



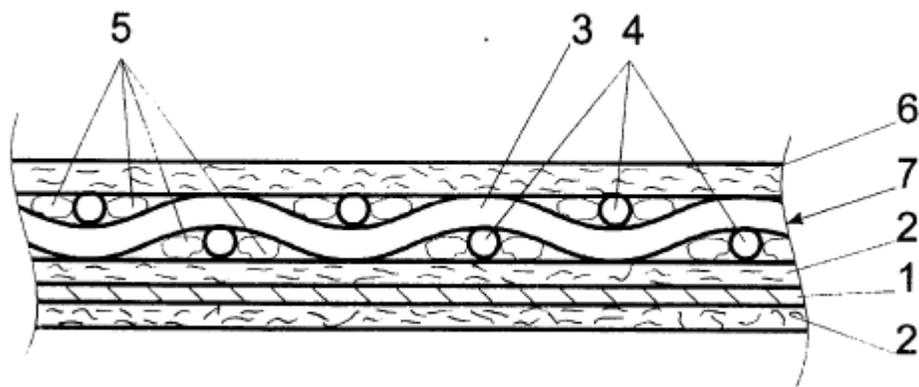
Figures 1 and 2, above, are schematic diagrams of equipment for carrying out the coating and calendering steps, respectively of Lou’s process.

Ex. 1005, 2:34–40. With reference to Figures 1 and 2, fibrous base sheet 1 is fed from supply roll 10 under screw melt-extruder 20, which supplies polypropylene polymer 2 through a slit orifice to deposit a thin continuous coating on the surface of sheet 1. *Id.* at 2:38–42. Sheet 1 “is supported on roll 30 as the coating is applied,” and “[c]oated sheet 3 is then advanced to windup as roll 40.” *Id.* at 2:42–44. Coated sheet 3 is then fed from roll 40

to a calendering nip formed by heated roll 50 and unheated backup roll 60, then under chill roll 70 to form coated and calendered sheet 4, which is in turn wound up as roll 80. *Id.* at 2:44–49. According to Lou, the coating and calendering steps can be performed as a continuous operation. *Id.* at 2:50–52. Lou discloses that suitable fibrous base sheets for use in the process include woven and nonwoven sheets, with nonwoven sheets of continuous filaments of synthetic organic polymer, particularly of polypropylene or polyester, being preferred. *Id.* at 2:66–3:4.

2. Büsscher

Büsscher, titled “Breathable Façade Membranes and/or Roof Underlay Materials and/or Wind Barrier Membranes,” is directed to a material that can be used, for example, as a roofing underlayment. Ex. 1008, codes (54), (57). Büsscher’s sole Figure is reproduced below.



Büsscher’s Figure, above, shows a cross-section through the material of Büsscher’s invention. *Id.* at 4. With reference to the Figure, Büsscher explains that largely waterproof but moisture-permeable film 1 is protected on both sides by nonwovens 2, 2', each made of polypropylene. *Id.* at 5. According to Büsscher, glass cloth 7, consisting of weft fibers 3 and warp fibers 4, is connected to the top of nonwoven 2' in the figure, but a plastic

cloth or a glass or plastic nonwoven may be used in place of glass cloth 7. Büsscher explains that interspaces between the intersections of weft fibers 3 and warp fibers 4, through which air and moisture can pass, are filled largely, but not completely, with bitumen 5 or a polymer bitumen, such that no additional adhesive is needed to establish a connection with nonwoven 2'. *Id.* The top side of glass cloth 7 is covered by plastic fiber nonwoven 6, preferably consisting of polypropylene, to “increase[] . . . slip resistance and thus improve[] walkability.” *Id.* at 4–5.

3. *Simpson*

Simpson, titled “Roof Structure,” is directed to a laminated roofing material for application over a roofing underlayment. Ex. 1009, codes (54), (57). The material includes an aluminum foil top sheet laminated to a polyethylene film layer by an ionomer resin, “to reflect infrared and ultraviolet rays impinging on the roofing from the sun.” *Id.* at code (57), 1:41–50.

4. *Ellison*

Ellison, titled “Warp Knit Weft Insertion Fabric and Plastic Sheet Reinforced Therewith,” is directed to a fabric to be “employed as a reinforcement for sheet material of thermoplastic synthetic resin.” Ex. 1010, codes (54), (57). According to *Ellison*, “[t]he reinforced sheet material so produced has a markedly higher ratio of tear strength to tensile strength than similar reinforced sheet materials hitherto available and is useful in a wide variety of industrial applications,” including “roofing products.” *Id.* at code (57), 1:54–68, 5:18–27. Figure 2 of *Ellison* is reproduced below.

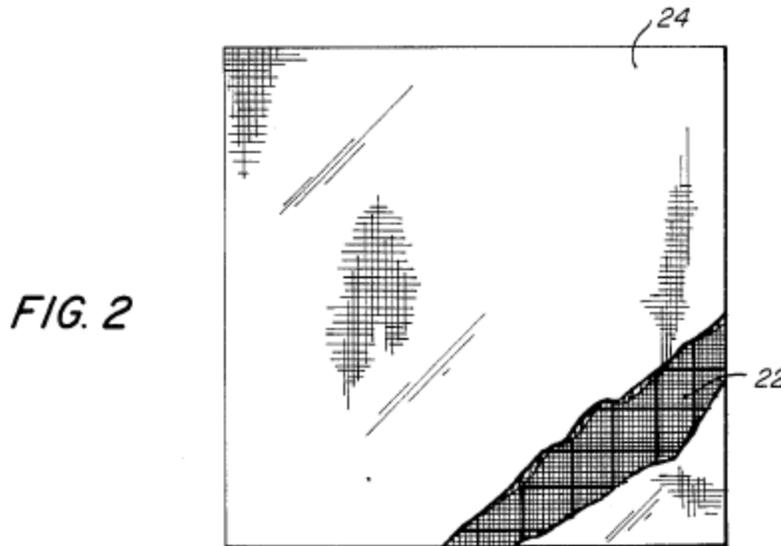


Figure 2, above, “illustrate[s] in plan view a typical reinforced polymeric resin sheet 24” “with a portion of the top layer peeled off to show the reinforcing layer.” *Id.* at 2:66–68, 4:27–29. “The reinforcing fabric, in the particular embodiment shown, is the warp knit weft insertion fabric 22 a portion of which is seen in the cutaway portion of the sheet 24.” *Id.* at 4:29–32. According to Ellison, “[t]he polymeric resin can be any of the resins commonly employed in preparing such sheets,” including “polyvinyl chloride, polyvinyl fluoride, polyurethane, ABS, polyamides such as nylon, dacron and the like, polyethylene, Mylar®, and the like.” *Id.* at 4:32–37. Ellison further discloses that “[t]he reinforcing fabric 22 can be incorporated in the polymeric resin by any of the conventional techniques such as lamination, i.e. heat bonding the reinforcing between two sheets of the polymeric resin, coating the fabric with the molten polymeric resin and like techniques.” *Id.* at 4:37–42.

5. *Goodacre*

Goodacre, titled “Laminate Material with Fibrous Inner Layer,” is directed to a “laminate material suitable for use in place of a safety mesh

used in construction of roofing.” Ex. 1011, codes (54), (57). The laminate includes at least three layers, including at least one fibrous inner layer adhesively bonded to adjacent paper or metal foil layers. *Id.* at code (57), 1:34–38. According to Goodacre, the fibrous layer “[m]ost conveniently . . . is woven material” and may comprise fibers “of polymeric material, such as a thermoplastic material; polyolefin fibres being particularly preferred.” *Id.* at 1:39–46, 1:57–58. “Where of a thermoplastic,” Goodacre explains, “the fibrous material may be biaxially oriented for increased strength.” *Id.* at 1:55–57. Figure 1 of Goodacre is reproduced below.

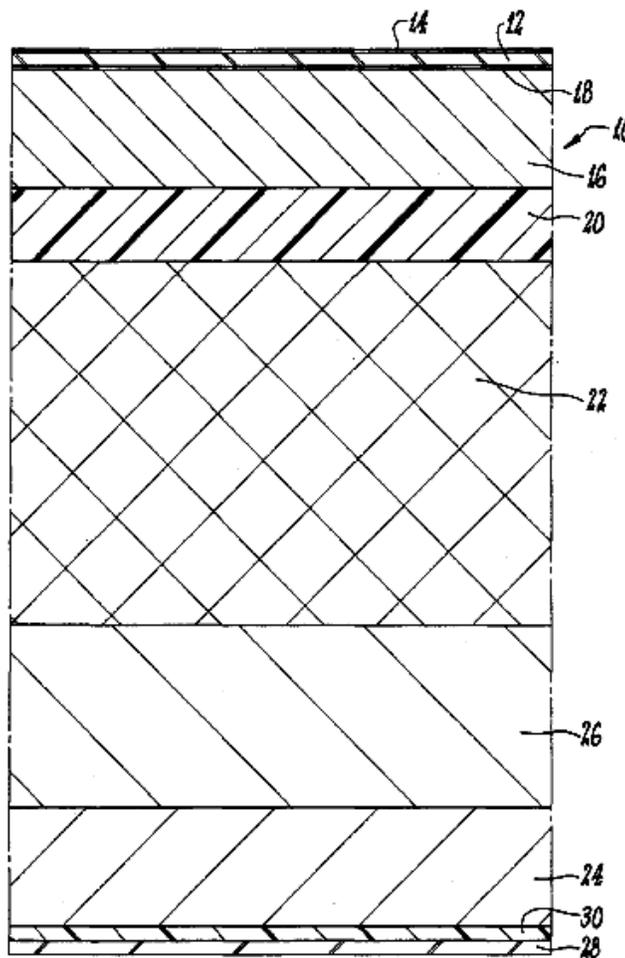


FIG 1

Goodacre discloses, *inter alia*, a step in which, simultaneously: (1) laminate subassembly 46 (comprising foil 12 and paper 16, bonded by adhesive 18) passes from oven 44 and through the nip of rollers 48 of extrusion coater 50; (2) polypropylene fabric 22 is drawn from supply roll 52 and likewise passes through the nip of rollers 48; and (3) extruder 54 of extrusion coater 50 extrudes polypropylene film 20 between paper 16 and fabric 22, thereby forming laminate subassembly 56. *Id.* at 4:24–33.

6. *Curran*

Curran, titled “Vapor Permeable Shingles and Underlayment Sheeting for a Roof Covering,” relates to a roofing system in which asphaltic shingles and an underlayment sheeting are provided with “an array of pierced openings . . . arranged to permit only the passage therethrough of water vapor under vapor pressure and concurrently prevent passage of liquid water therethrough.” Ex. 1012, codes (54), (57). According to Curran, conventional roof coverings may contribute to a serious adverse condition in buildings lacking suitable roof ventilation, as “trapped water vapor condenses to form free water on the underside of the roof and cause[s] damage and deterioration of the structure in and below the attic.” *Id.* at 1:23–60. Curran explains that “[p]referably, the pierced openings . . . substantially are circular holes having a diameter less than [sic] 0.0156” (1/64”),” though “the particular size and shape of the pierced openings can vary so long as they function as described herein.” *Id.* at 3:44–48. In particular, Curran explains, “the size, number and position of the apertures . . . should be selected to enable vapor pressure to escape through the shingles . . . in proportion to the rate at which the vapor pressure passes between the free air space about the panels . . . and through the underlayment.” *Id.* at 4:25–30.

7. *Howells*

Howells, titled “Fabric Mesh Reinforced Monolithic Thermoplastic Membrane,” is directed to an “open mesh fabric reinforced monolithic thermoplastic membrane which can be used as a roofing membrane,” as well as a membrane extrusion process for manufacturing such a membrane. Ex. 1006, codes (54), (57), 2:2–4, 4:10–21. According to Howells, the conventional way of making fabric mesh reinforced thermoplastic membranes for use as roofing membranes involved extruding molten thermoplastic first onto one side of a fabric mesh, and then extruding another layer of molten thermoplastic onto the other side of the fabric mesh, resulting in an unsatisfactory three-ply product with a rippled surface and susceptibility to delamination. *Id.* at 2:6–21. According to Howells, the disclosed “process permits the fabric mesh reinforced thermoplastic membrane to be made in a single step,” resulting in a single layer monolithic membrane wherein “the reinforcing fabric mesh is fully encapsulated in [a] single layer of thermoplastic.” *Id.* at 8:13–16. Thus, Howells explains, “the membrane cannot delaminate, the fabric mesh is fully integral with the layer [of thermoplastic] to provide maximum strength and reinforcement, and the fabric mesh is fully protected by the thermoplastic layer.” *Id.* at 8:17–20.

Figure 3 of Howells is reproduced below.

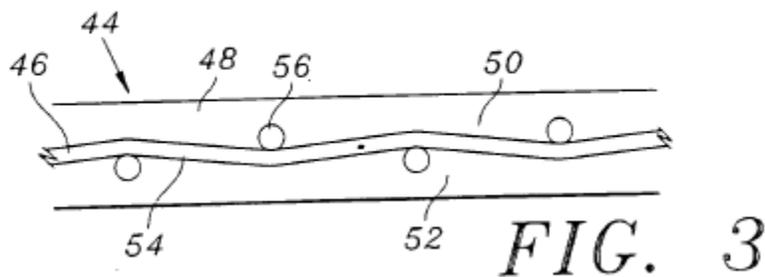


Figure 3, above, is a cross-sectional view of the fabric mesh reinforced thermoplastic membrane of Howells' invention. Ex. 1006, 7:6–8. With reference to Figure 3, Howells explains that lateral mesh fabric fibers or strands 54 and longitudinal mesh fabric fibers or strands 56 of open mesh fabric mesh 46 are encapsulated between first and second sides 50, 52 of thermoplastic membrane 44. *Id.* at 11:1–4. According to Howells, “[v]irtually any type of thermoplastic can be utilized,” but “[p]olypropylene based thermoplastic olefin . . . has been found to be very suitable because of its thermoplastic properties, its strength and its resistance to oxidation and UV.” *Id.* at 8:25, 9:6–9. Howells further discloses that “[t]he fabric mesh can be made of plastic material such as polyester or nylon, natural fibers such as cotton or hemp, or metal,” and “can be a woven mesh or a non-woven mesh.” *Id.* at 9:19–24.

E. Lou-based Grounds

1. Anticipation of Claims 1, 8–12, and 19 by Lou

Petitioner contends that independent claim 1 and dependent claims 8–12 and 19 are anticipated by Lou. Pet. 21–25. Patent Owner opposes. PO Resp. 19–27. Having considered the arguments and evidence before us, we find that Petitioner has established by a preponderance of the evidence that claims 1, 8–12, and 19 are anticipated by Lou.

a. Claim 1

Petitioner contends that Lou discloses all elements of independent claim 1. Pet. 21–24. In support of its contentions, Petitioner provides a detailed mapping of Lou to each claim element, along with citations to Mr. Kaczkowski's supporting declaratory evidence. *Id.* (citing Ex. 1005, code (57), 1:7–14, 2:6–9, 2:34–49, 2:66–3:4, 3:15–26, 5:48–50, 6:37–7:13; Ex. 1003 ¶¶ 19, 61, 63–65). Petitioner maps Lou's fibrous base sheet 1 to

the “reinforcing scrim of interwoven strands” recited in claim 1 and Lou’s polypropylene polymer 2 to the recited “thermoplastic material.” *Id.* at 22–23. Petitioner further contends that Lou discloses “affixing the thermoplastic material by extrusion lamination,” citing Lou’s disclosures that “[e]xtruder 20 supplies polypropylene polymer 2 through a slit orifice to deposit a thin continuous coating on the surface of sheet 1” and that coated sheet 3 is pressed by a calendaring nip formed by heated and unheated rolls. *Id.* at 23 (quoting Ex. 1005, 2:34–44) (citing Ex. 1003 ¶ 19; Ex. 1005, 2:45–49).

In response, Patent Owner contends that the Petition fails to demonstrate that the thermoplastic material in Lou is affixed by an “extrusion lamination” process, as recited in claim 1. PO Resp. 19–27. More particularly, Patent Owner argues, “Lou does not disclose that the polypropylene polymer 2 is affixed to the woven sheet 1 by extrusion lamination,” but “[r]ather, Lou explicitly teaches using extrusion coating.” *Id.* at 19 (citing Ex. 1005, 3:23–25). As we have detailed in our claim construction discussion in Section III.C above, Patent Owner contends that extrusion coating and extrusion lamination are “very different.” *Id.* at 20–21. Further, Patent Owner contends, “the resulting structure of Lou is structurally different than a product formed by extrusion lamination.” *Id.* at 25. According to Patent Owner, “[e]xtrusion coating’ results in the substrate, such as the fibrous base sheet 1 of Lou, being coated with an extrudate, such as the thermoplastic material.” *Id.* at 26 (citing Ex. 2021 ¶ 78). However, Patent Owner alleges, “there is no guarantee that the thermoplastic material is affixed to the substrate.” *Id.* (citing Ex. 2020, 23:7–13). According to Patent Owner, “‘extrusion coating’ relies only upon the extrusion of the thermoplastic material onto the substrate for bonding of

the two layers,” “[t]he level of affixing is variable,” and “it merely uses the thermoplastic material to coat, as opposed to affixing two layers together using the thermoplastic material.” *Id.* at 26–27 (citing Ex. 2021 ¶ 78). In contrast, Patent Owner argues, “[e]xtrusion lamination’ . . . uses pressure to laminate two layers together using the polymer melt as a binder. . . . ensur[ing] that the two layers are affixed together by the polymeric melt.” *Id.* at 27 (citing Ex. 2021 ¶ 79). That “[t]his is a very different result that a product made by the process of ‘extrusion coating[]’ . . . is made clear,” Patent Owner contends, “by a comparison of either of the product in Lou to the example in Fig. 2 of the ’482 patent.” *Id.*

Petitioner replies that Patent Owner’s expert Dr. Daniels interpreted “extrusion lamination” as “the specific process that uses both extrusion and pressing to laminate two layers together using the polymer as a binder,” and further that he admitted during his deposition that Lou discloses each element of that interpretation: extrusion, pressing of the polymer melt into the scrim following extrusion, and binding of the extrudate and the substrate. Pet. Reply 11–13 (quoting Ex. 2021 ¶ 68) (citing Ex. 1022, 12:12–17, 13:22–14:9, 16:24–17:4, 17:15–22, 30:16–22). According to Petitioner, although Dr. Daniels further opined that the temperature of Lou’s calendering rolling is “below the melting point of polypropylene,” whereas “to achieve a good bonding in lamination . . . it is most advisable to have the material in a, essentially, liquid form,” he also admitted (1) that his “interpretation of ‘extrusion lamination’ does not require ‘at the time that the pressure is being applied, that the extrudate is at any particular temperature’” but was “only about . . . the ‘most advisable’ process conditions”; (2) that he was unable to say for certain with regard to “the ‘dynamics going on there which may compromise the ability to achieve a good, firm and sufficient

binding”); (3) that Lou “teaches a melt temperature of 293°C, which is almost ‘130 degrees Celsius above the melting point’ of the polypropylene resin” and a significant amount of cooling would therefore need to occur before there would be any solidification of the polymer melt, the time required for which he did not know; and (4) that “he performed no analysis to determine whether his speculation regarding potential solidification of the polymer melt was correct” or whether it “would have any effect on the binding of the layers in Lou.” *Id.* at 13–15 (emphasis omitted) (quoting Ex. 1022, 17:15–18:20, 19:9–21, 21:16–23:17) (citing Ex. 1022, 19:1–8, 23:18–22, 24:1–16, 33:2–34:9). Petitioner further replies that Lou teaches “extrusion lamination” under the construction of “by extrusion lamination” set forth in the EDTX Claim Construction Order, i.e., “by being melted in an extruder, and forced onto the reinforcing scrim through the die of the extruder,” which Dr. Daniels opined is “important and accurate.” *Id.* at 15–16 (quoting Ex. 2023, 67; Ex. 1022, 7:20–8:5). In this regard, Petitioner argues that “Dr. Daniels testified that Lou discloses melting an organic polymer in a screw melt extruder, and forcing a thermoplastic material onto the scrim through the die of the extruder, thus satisfying both clauses in [the Court’s] construction.” *Id.* at 16 (citing Ex. 1022, 28:2–29:21).

In its Sur-reply, Patent Owner responds that Petitioner’s arguments are based on a misreading of Dr. Daniels’ testimony and that Lou does not teach bonding two layers by using a thermoplastic material to bind the two layers. PO Sur-reply 10. According to Patent Owner, whereas Petitioner argues that Dr. Daniels “admitted that his interpretation of ‘extrusion lamination’ does not require ‘at the time that the pressure is being applied, that the extrudate is at any particular temperature,’” “[t]his characterization is wrong, in that clear pressure must be applied when the extrudate is of a

sufficient temperature to be soft and allow it to penetrate the scrim.” *Id.* (citing Pet. Reply 13; Ex. 1022, 19:13–21, 23:18–25 (Dr. Daniels testifying, “I think a person of skill in the art would recognize that in order for you to get a material to penetrate a scrim . . . you would want to have the material as fluid at possible” and that the “solidification process takes place pretty rapidly.”)). Further, Patent Owner contends, the beginning of the solidification or crystallization process will reduce or prevent the material from penetrating the scrim. *Id.* at 10–11. Still further, Patent Owner contends, Petitioner’s arguments that “Lou teaches ‘extrusion lamination’ under the construction provided by the court in the Eastern District of Texas . . . ignore[] the arguments presented by Patent Owner on this point, and fail[] to address any of them,” and “[i]n addition, the court in the Western District of Texas concluded that ‘extrusion lamination’ should be given its plain and ordinary meaning,” “consistent with Petitioner’s original construction and Patent Owner’s construction throughout this proceeding.” *Id.* at 11–12 (citing Pet. Reply 16; PO Resp. 21–27; Ex. 2026, 3).

Having fully considered the parties’ arguments and evidence, we conclude that Petitioner has shown by a preponderance of the evidence that Lou anticipates claim 1. Patent Owner does not dispute that Lou discloses a “roofing underlayment positioned between a roof support structure and an overlayment,” as recited in the preamble of claim 1, or that Lou discloses that such underlayment includes both “a reinforcing scrim of interwoven strands for supporting tensile forces in multiple directions” and “at least one layer of thermoplastic material affixed to a side of the reinforcing scrim” “for providing a weather-resistant barrier.” Moreover, we are persuaded that Lou discloses that such thermoplastic material is affixed to the scrim “by extrusion lamination,” as we have interpreted that term in our above claim

construction discussion. *See supra* § III.C. In contrast with the calendering method distinguished by the inventor during prosecution of the '482 patent, Lou's method extrudes molten polymer. Lou also uses pressure, not merely a coating process, and expressly provides that the coating and calendering steps can be performed as a continuous process. Ex. 1005, 2:50–52, Figs. 1, 2. Although Patent Owner contends that Lou instead utilizes “extrusion coating,” we find Lou's disclosure to be substantially the same as embodiments described in the specification of the '482 patent cited by Patent Owner as examples of extrusion lamination. *Compare, e.g.*, PO Resp. 23 (emphasis omitted) (“[T]he specification discloses that ‘[t]he waterproof material 14 is *preferably a layer of thermoplastic film which is extruded over each side of the scrim,*’ or in a different embodiment, ‘only one of [the scrim's] sides [is] coated with a thermoplastic layer 14.’ [Ex. 1001,] 3:63–4:8.”), *with* Ex. 1005, 2:40–42 (“Extruder 20 supplies polypropylene polymer 2 through a slit orifice to deposit a thin continuous coating on the surface of sheet 1.”).

b. Claim 8

Claim 8 depends from claim 1 and further recites “wherein the thermoplastic layer is a film-forming polymer.” Ex. 1001, 6:44–45. Petitioner contends that “Lou discloses a film-forming polymer because Lou teaches a polypropylene polymer 2 (or resin) that forms a coating when extruded onto fibrous base sheet 1” and that a person of ordinary skill in the art would understand polypropylene to be a film-forming polymer. Pet. 24 (citing Ex. 1005, 2:34–44, 3:23–31; Ex. 1003 ¶ 66).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 8.

We are persuaded by Petitioner’s unrebutted arguments and supporting evidence regarding the additional limitation of claim 8, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 8 is, accordingly, anticipated by Lou.

c. Claim 9

Claim 9 depends from claim 8 and further recites “wherein the layer of thermoplastic layer [sic] is extruded onto the reinforcing scrim.” Ex. 1001, 6:46–47. Petitioner contends that Lou anticipates this claim for the same reasons as described for the “at least one layer of thermoplastic material affixed to a side of the reinforcing scrim by extrusion lamination” limitation of claim 1. Pet. 24.

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 9.

For the reasons stated in our discussion of claim 1, we are persuaded by Petitioner’s arguments and supporting evidence with respect to Lou’s disclosure of extrusion lamination, which involves extrusion of a thermoplastic layer onto Lou’s scrim, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 9 also is, accordingly, anticipated by Lou.

d. Claim 10

Claim 10 depends from claim 1 and further recites “wherein the thermoplastic layer may include polyethylene or polypropylene.” Ex. 1001, 6:48–50. As stated above in the discussion of claim 8, Petitioner contends that “Lou discloses utilizing a polypropylene polymer 2 (or resin) as its thermoplastic layer,” as recited in claim 10. Pet. 24 (citing Ex. 1005, 2:34–44, 3:23–31).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 10.

We are persuaded by Petitioner's unrebutted arguments and supporting evidence regarding the additional limitation of claim 10, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 10 is, accordingly, anticipated by Lou.

e. Claim 11

Claim 11 depends from claim 1 and further recites "wherein the interwoven strands comprise a thermoplastic polymer." Ex. 1001, 6:51–52. Petitioner contends that "Lou discloses that the fibrous base sheet 1 is formed of 'polypropylene or polyester . . . slit films or tapes'" and that both "[p]olypropylene and polyester are thermoplastic polymers." Pet. 24–25 (quoting Ex. 1005, 2:66–3:7) (citing Ex. 1003 ¶ 69).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 11.

We are persuaded by Petitioner's unrebutted arguments and supporting evidence regarding the additional limitation of claim 11, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 11 is, accordingly, anticipated by Lou.

f. Claim 12

Claim 12 depends from claim 11 and further recites "wherein the thermoplastic polymer strands are formed from one of polyethylene, polypropylene, polyester, and nylon." Ex. 1001, 6:53–55. Petitioner contends that "Lou discloses thermoplastic polymer strands formed from polypropylene or polyester fabric for the same reasons described above with respect to [c]laim 11." Pet. 25.

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 12.

We are persuaded by Petitioner’s unrebutted arguments and supporting evidence regarding the additional limitation of claim 12, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 12 is, accordingly, anticipated by Lou.

g. Claim 19

Claim 19 depends from claim 1 and further recites “wherein the roofing underlayment provides for passive ventilation of air while providing a waterproof barrier.” Ex. 1001, 7:8–10. Quoting disclosure in Lou, Petitioner contends that “Lou discloses passive air ventilation and a waterproof barrier by teaching that the underlayment ‘provides vapor permeability to the sheet while maintaining liquid water impermeability’” and that “[t]he sheets, being vapor-permeable, liquid-impermeable and strong, are particularly suited for use as underslayment and building air-infiltration barriers.” Pet. 25 (quoting Ex. 1005, code (57), 3:62–64) (citing Ex. 1005, 1:7–14, 6:37–7:13; Ex. 1003 ¶ 72).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claim 19.

We are persuaded by Petitioner’s unrebutted arguments and supporting evidence regarding the additional limitation of claim 19, and we conclude that Petitioner has shown by a preponderance of the evidence that claim 19 is, accordingly, anticipated by Lou.

2. Obviousness of Claims 2 and 3 over Lou and Büsscher

Claim 2 depends from claim 1 and recites that the claimed underlayment further comprises “a layer of slip-resistant material positioned over an outer surface of the roofing underlayment.” Ex. 1001, 6:28–30.

Claim 3 depends from claim 2 and recites “wherein the slip-resistant material is formed from polypropylene.” *Id.* at 6:31–32.

Petitioner contends that claims 2 and 3 would have been obvious over Lou in view of Büsscher. Pet. 25–27. In support of its arguments with respect to this ground, Petitioner relies on Lou for the teaching of the elements of base claim 1, as set forth in the asserted ground based on anticipation by Lou (*see supra* § III.E.1.a), and further contends that a person of ordinary skill in the art would have been motivated to add Büsscher’s plastic fiber nonwoven 6 to Lou’s underlayment “at least to improve roofer safety by providing a slip-resistance feature, to improve water resistance, and to prevent sticking.” Pet. 25–27 (citing Ex. 1008, 4–5; Ex. 1003 ¶¶ 76–77). Petitioner further points out that Büsscher’s slip-resistant plastic fiber nonwoven 6 is formed of polypropylene, as required by claim 3. *Id.* at 27 (citing Ex. 1008, 4–5).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claims 2 and 3. *See* PO Resp. 27.

Having fully considered the parties’ arguments and evidence, we conclude that Petitioner has shown by a preponderance of the evidence that claims 2 and 3 are unpatentable over the combination of Lou and Büsscher. We find that Petitioner’s contentions are supported by the evidence of record, and as noted above, Patent Owner does not dispute that Büsscher discloses a slip-resistant material positioned over an outer surface of a roofing underlayment, as recited in claim 2, or that such slip-resistant material is formed from polypropylene, as recited in claim 3. Further, we find that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from

Mr. Kaczkowski's testimony) to combine the relevant teachings of Lou and Büsscher.

3. *Obviousness of Claims 4–6 and 18 over Lou and Simpson*

As stated in the claim construction discussion above, claim 4 depends from claim 1 and recites that the roofing underlayment further comprises “a radiant barrier layer for reflecting solar energy positioned adjacent the layer of thermoplastic material.” Ex. 1001, 6:33–35. Claim 5 depends from claim 4, and further recites “wherein the radiant barrier layer is a metalized film.” *Id.* at 6:36–37. Claim 6 depend from claim 4 and further recites “wherein the radiant barrier layer is an aluminum coating applied to the layer of thermoplastic material.” *Id.* at 6:38–40. Claim 18 depends from claim 4 and further recites “wherein the radiant barrier layer satisfies the standards of emissivity and reflectivity set forth in procedure ASTM E-408 of the American Society of Testing Materials.” *Id.* at 7:4–7.

Petitioner contends that dependent claims 4–6 and 18 would have been obvious over Lou in view of Simpson. Pet. 27–30 (citing Ex. 1009, 1:20–21, 1:41–50, 3:13–16; Ex. 1003 ¶¶ 82–84, 86, 87). In support of its arguments with respect to this ground, Petitioner relies on Lou for the teaching of the elements of base claim 1, as set forth in the asserted ground based on anticipation by Lou (*see supra* § III.E.1.a), and further contends that a person of ordinary skill in the art would have been motivated to add Simpson's multilayered roofing laminate that has an aluminum barrier layer, i.e., a metalized film as recited in claim 5, bonded to an adjacent thermoplastic layer as recited in claim 6, for reflecting UV radiation, i.e., solar energy as recited in claim 4. *Id.* at 27–29 (citing Ex. 1003 ¶¶ 82–84). Like the '482 patent, Petitioner contends, “Simpson's multi-layered roofing laminate 10 includes a thin layer of an aluminum foil sheet 18 ‘to reflect

infrared and ultraviolet rays on the roofing from the sun.” *Id.* at 28.

According to Petitioner, with supporting testimony from Mr. Kaczkowski, a person of ordinary skill in the art “would have been motivated to position Simpson’s aluminum barrier layer adjacent to the thermoplastic layer of Lou,” as “[b]oth Lou and Simpson teach multi-layered roofing membranes,” and “[c]ombining their teachings would, predictably, allow Lou to reflect harmful UV radiation, thereby further helping to prevent degradation and reducing heat transmission into the building.” *Id.* at 28–29 (citing Ex. 1003 ¶ 82). Regarding claim 18, Petitioner contends that “ASTM E408 does not establish a performance threshold for emissivity and reflectivity,” but “rather, it defines test methods for measuring them.” *Id.* at 30 (citing Ex. 1003 ¶ 86). According to Petitioner, a person of ordinary skill in the art “would therefore understand that Simpson discloses a radiant barrier layer that ‘satisfies’ (or can be tested by) the standard of emissivity and reflectivity set forth in ASTM E408 in so much as Simpson, like the ’482 patent, discloses an aluminum radiant barrier layer” that “[b]y its nature . . . reflects and emits UV light.” *Id.* (citing Ex. 1003 ¶ 86).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claims 4–6 and 18. *See* PO Resp. 27.

Having fully considered the parties’ arguments and evidence, we conclude that Petitioner has shown by a preponderance of the evidence that claims 4–6 and 18 are unpatentable over the combination of Lou and Simpson. We find that Petitioner’s contentions are supported by the evidence of record, and as noted above, Patent Owner does not dispute that Simpson discloses the additional elements recited in claims 4–6 or that Simpson’s aluminum barrier level “satisfies” the additional limitation set

forth in claim 18. Further, we find that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski's testimony) to combine the relevant teachings of Lou and Simpson.

4. *Obviousness of Claims 7, 15, and 16 over Lou and Ellison*

Claim 7 depends from claim 1 and recites that the roofing underlayment further comprises “a layer of thermoplastic material attached to both sides of the reinforcing scrim.” Ex. 1001, 6:41–43. Claim 15 depends from claim 1 and further recites “wherein a thermoplastic layer is affixed to both sides of the reinforcing scrim.” *Id.* at 6:62–64. Claim 16 depends from claim 15 and further recites “wherein the thermoplastic layers are co-extruded over both sides of the reinforcing scrim.” *Id.* at 6:65–67.

Petitioner contends that claim 7, 15, and 16 would have been obvious over Lou in view of Ellison. Pet. 30–33 (citing, e.g., Ex. 1005, Fig. 1; Ex. 1010, 4:36–46, 5:18–28; Ex. 1003 ¶¶ 19, 88–89, 91). In support of its arguments with respect to this ground, Petitioner relies on Lou for the teaching of the elements of base claim 1, as set forth in the asserted ground based on anticipation by Lou (*see supra* § III.E.1.a), and further contends that “Ellison teaches a multilayered sheet for use in roofing products that has a layer of thermoplastic (polymeric resin) on both sides of a reinforcing scrim,” citing disclosure in Ellison that “[t]he reinforcing fabric 22 can be incorporated in the polymeric resin by any of the conventional techniques such as lamination, i.e. heat bonding the reinforcing fabric between two sheets of the polymeric resin.” Pet. 30–31 (quoting Ex. 1010, 4:36–42). Relying on the testimony of Mr. Kaczkowski, Petitioner contends that a person of ordinary skill in the art would have been motivated to combine Lou and Ellison. *Id.* at 31–32 (citing Ex. 1003 ¶¶ 88–89). Petitioner argues

both “Lou and Ellison disclose laminates comprising reinforcing scrim coated with molten thermoplastic for use as roofing products,” and a person of ordinary skill in the art “would have wanted to put Lou’s thermoplastic layer on both sides of the scrim in order to fully encapsulate it.” *Id.* at 31 (citing Ex. 1003 ¶¶ 88–89). According to Petitioner, “Lou’s thermoplastic layer (polypropylene polymer 2) covers only one surface of the scrim (fibrous base sheet 1), which leaves the other surface exposed,” and a person of ordinary skill in the art “would have further understood at the relevant time that encapsulating Lou’s scrim with thermoplastic protects the scrim and fully integrates it into the membrane, which maximizes strength and prevents delamination.” *Id.* (citing Ex. 1003 ¶¶ 88–89; Ex. 1006, 8:13–24).

With respect specifically to claim 16, which recites that the thermoplastic layers are “co-extruded” over both sides of the reinforcing scrim, Petitioner further points out that Lou teaches extruding molten thermoplastic onto its reinforcing scrim and that Ellison teaches coating both sides of its reinforcing fabric 22 with molten polymeric resin “by any of the conventional techniques.” Pet. 32 (citing Ex. 1005, Fig.1; Ex. 1010, 4:36–46). Petitioner contends that a person of ordinary skill in the art “would have appreciated that co-extrusion was a conventional technique for coating both sides of a substrate as of March 15, 1999,” and that “[i]t would have therefore been obvious to modify Lou with thermoplastic layers co-extruded over both sides of Lou’s scrim, as taught by Ellison.” *Id.* at 32–33 (citing Ex. 1003 ¶ 91).

Patent Owner relies only on its arguments with respect to claim 1 and does not present separate arguments for claims 7 and 15. *See* PO Resp. 27. With respect to claim 16, Patent Owner contends that Ellison does not disclose that the thermoplastic layers are “co-extruded over both sides of the

reinforcing scrim,” but “[a]t best . . . describes a reinforcing fabric 22 with a thermoplastic layer on each side.” PO Resp. 28 (citing Ex. 1010, 4:36–42). Further, according to Patent Owner, “as noted by Petitioner and Mr. Kaczkowski, Ellison teaches that ‘heat bonding the reinforcing fabric **between two sheets of the polymeric resin**,” which “is certainly not a co-extrusion process,” and “Ellison goes on to list at least two other techniques, neither of which is co-extrusion.” *Id.* (quoting Ex. 1003 ¶ 88) (citing Ex. 1010, 4:36–42; Ex. 2020, 55:20–56:3; Ex. 2021 ¶ 84). Patent Owner further contends that co-extrusion “can be an expensive process that requires a very specific set up” and “is not a simple process.” *Id.* at 29 (citing Ex. 1003 ¶ 41; Ex. 2021 ¶ 86). Still further, Patent Owner contends, “one of the techniques described in Ellison is ‘coating the fabric with the molten polymeric resin,’ which, Patent Owner argues, ‘is exactly the process already described in Lou.’” *Id.* at 30 (citing Ex. 1010, 4:41–42, 2:40–42). Thus, Patent Owner argues, a person of ordinary skill in the art “looking to incorporate the teachings of Ellison, would be motivated to use the very teachings of Lou that Ellison also includes – extrusion coating” and “would not have modified Lou to use the more expensive and complicated process of co-extrusion.” *Id.* at 31 (citing Ex. 2021 ¶ 89).

Petitioner responds in its Reply that, although Mr. Kaczkowski testified that “the term ‘co-extrusion’ does not appear in Ellison,” he also testified that Ellison “‘clearly describes the variety of resins and lamination techniques, which a person of ordinary skill would recognize include the option of co-extrusion,’ and also ‘describes a structure which a person of ordinary skill in the art would recognize could be manufactured by co-extrusion.’” Pet. Reply 18 (quoting Ex. 2020, 56:24–57:17) (citing Ex. 1003 ¶ 88). Petitioner contends that Dr. Daniels did not dispute either point.

Moreover, Petitioner argues, “there is no requirement under 35 U.S.C. § 103 that Ellison provide *in haec verba* disclosure of co-extrusion, and Mr. Kaczkowski’s unrebutted testimony establishes that a [person of ordinary skill in the art] would have recognized that co-extrusion fit squarely within the description of processes that could be used to make the product described” in Ellison. *Id.*

In its Sur-reply, Patent Owner argues that Petitioner’s Reply argument “ignores that Ellison already teaches other methods of achieving the products it describes”; that “Petitioner and Mr. Kaczkowski fail to explain why a [person of ordinary skill in the art] would forego those explicit teachings and instead modify Ellison to use co-extrusion”; and that “neither Petitioner nor Mr. Kaczkowski explain how that would then be integrated into the teaching of Lou.” PO Sur-reply 12.

Having fully considered the parties’ arguments and evidence, we conclude that Petitioner has shown by a preponderance of the evidence that claims 7, 15, and 16 are unpatentable over the combination of Lou and Ellison. We find that Petitioner’s contentions are supported by the evidence of record, and we find that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou and Ellison. As noted above, Patent Owner does not challenge Petitioner’s contentions that Ellison discloses a layer of thermoplastic material attached (as in claim 7) or affixed (as in claim 15) to both sides of a reinforcing scrim. With respect to claim 16, we are persuaded by Petitioner’s arguments and supporting evidence, including Lou’s express disclosure of extrusion of molten thermoplastic onto its reinforcing scrim and Ellison’s teaching of coating both sides of its reinforcing fabric 22 with

molten polymeric resin. *See* Pet. 32 (citing Ex. 1005, Fig.1; Ex. 1010, 4:36–46). Because Petitioner relies on the combined teaching of those references, Patent Owner’s arguments that Ellison alone contains no express teaching of “co-extrusion” (PO Resp. 28) is unavailing. Moreover, because Ellison, as cited by Petitioner, teaches coating both sides of its reinforcing fabric with molten polymer “by any of the conventional techniques” (Ex. 1010, 4:36–46) we also disagree with Patent Owner’s contention that Ellison’s disclosure of “at least two other techniques, neither of which is co-extrusion” (PO Resp. 28; PO Sur-reply 12) would render co-extrusion non-obvious in view of Lou’s and Ellison’s combined teachings. Nor do Patent Owner’s arguments that co-extrusion “can be . . . expensive” and that it is “not a simple process” (PO Resp. 29) persuade us of non-obviousness in view of Lou’s and Ellison’s teachings. Further, to the extent that Patent Owner argues that “one of the techniques described in Ellison is . . . exactly the process already described in Lou” (*id.* at 30), we have already determined above that Lou discloses extrusion lamination as recited in claim 1. *See supra* § III.E.1.a.

5. *Obviousness of Claims 13, 14, and 17 over Lou and Goodacre*

Claim 13 depends from claim 11 and further recites “wherein the thermoplastic polymer strands comprise oriented polypropylene.” Ex. 1001, 6:56–58. Claim 14 depends from claim 11 and further recites “wherein the thermoplastic polymer strands comprise cross-laminated polypropylene tapes.” *Id.* at 6:59–61. Claim 17 depends from claim 1 and further recites “wherein the reinforcing scrim comprises [sic] a mesh of individual, cross-laminated strands.” Ex. 1001, 7:1–3.

Petitioner contends that claims 13, 14, and 17 would have been obvious over Lou in view of Goodacre. Pet. 33–37 (citing, e.g., Ex. 1005,

2:66–3:4; Ex. 1011, Fig. 1, 1:28–33, 1:49–52, 3:8–23, 4:10–13, 5:45–53; Ex. 1003 ¶¶ 95–96, 98, 100, 101, 102). In support of its arguments with respect to this ground, Petitioner relies on Lou for the teaching of the elements of base claims 1 and 11, as set forth in the asserted ground based on anticipation by Lou (*see supra* §§ III.E.1.a, III.E.1.e), and further contends that “Goodacre teaches a multi-layered roofing laminate 10 with a woven polyolefin-based fibrous layer 22 that provides the tensile strength necessary for the laminate 10 to operate as a safety mesh,” where “fibrous layer 22 may also contain ‘fibrous material [that] may be biaxially oriented, for increased strength” and “may optionally be formed from woven polypropylene or polyethylene.” *Id.* at 33–34 (quoting Ex. 1011, 1:44–58 (emphasis added)) (citing Ex. 1011, Fig. 1, 1:28–33, 3:8–23, 4:10–13, 5:45–53).

Regarding claim 13, Petitioner further argues that a person of ordinary skill in the art “would have been motivated to modify Lou’s reinforcing scrim to include oriented polypropylene, as taught by Goodacre, in order to increase the tensile strength of Lou’s underlayment.” Pet. 34 (citing Ex. 1003 ¶ 95). Indeed, Petitioner contends, “like Goodacre, Lou discloses a reinforcing polypropylene scrim (fibrous base sheet 1) that ‘supplies the basic strength characteristics properties to the final coated and calendered product,’” and a person of ordinary skill in the art “would have therefore sought to maximize the tensile strength and tear resistance of Lou with Goodacre’s teachings.” *Id.* at 34–35 (quoting Ex. 1005, 3:15–17) (citing Ex. 1003 ¶ 95). Moreover, Petitioner argues, “orienting polyolefin fabric to increase tensile strength was well-known at the relevant time.” *Id.* at 35–36 (citing Ex. 1003 ¶ 96; Ex. 1014, 3–4; Ex. 1015, 3:3–8).

Regarding claims 14 and 17, Petitioner further contends that “Lou discloses a fibrous base sheet 1 made of ‘woven sheets of slit films or tapes’” and that “Goodacre teaches forming a reinforcing scrim . . . with cross-laminated polyethylene split film.” Pet. 36 (quoting Ex. 1005, 2:66–3:4) (citing Ex. 1011, 1:49–52). Petitioner contends that “[f]orming a reinforcing scrim from cross-laminating from split film was well-known at the relevant time,” and provided advantages including increased tensile strength and provision of a “simpler, less costly way to manufacture a nonwoven reinforcing scrim, which is consistent with Lou.” *Id.* at 36–37 (citing Ex. 1003 ¶¶ 100–102; Ex. 1005, 2:66–3:4; Ex. 1015, 5:10–15). Still further, Petitioner argues, Goodacre’s split films would have been understood by a person of ordinary skill in the art as being materially similar to tapes as a scrim-forming fabric, and “[i]t would have therefore been obvious to form Lou’s reinforcing scrim with cross-laminated polyethylene tapes to achieve the abovementioned benefits and for the reasons set forth above regarding Claim 13.” *Id.* at 37 (citing Ex. 1003 ¶ 101).

Patent Owner responds that the Petition and Mr. Kaczkowski fail to demonstrate that a person of ordinary skill in the art would have modified Lou with the teachings of Goodacre to disclose all the elements of claims 13, 14, and 17. PO Resp. 31–34. More particularly, Patent Owner argues, “Mr. Kaczkowski provides no analysis of the costs associated with orientating the polypropylene or using the cross-laminated airy fabrics anywhere in his declaration”; “[h]e testified that he did not perform any of such cost analysis”; and “[h]e further admitted that he does not know ‘whether the benefits of using orientation in Lou’s underlayment would outweigh the costs’ because he did not perform that analysis.” *Id.* at 32 (citing Ex. 2021 ¶ 93; Ex. 2020, 64:8–15, 65:3–66:3, 66:22–67:6, 67:8–22,

82:4–8). Patent Owner further contends that “Mr. Kaczkowski also did not describe or analyze the different equipment that would be needed to orientate the polypropylene or use the cross-laminated airy fabrics,” and “[w]ithout any of this information, there is no basis for his opinions regarding costs.” *Id.* (citing Ex. 2020, 82:9–22; Ex. 2021 ¶ 94). Rather, Patent Owner contends, “Mr. Kaczkowski admitted[] his opinions are merely an opinion that a [person of ordinary skill in the art] would have evaluated using cross-lamination or orienting the polypropylene in the fabric,” and he “does not indicate what the results of that evaluation would have been.” *Id.* at 33 (citing Ex. 2020, 73:13–20; Ex. 2021 ¶ 95).

According to Patent Owner, a person of ordinary skill in the art “would look to determine all costs before deciding whether to move forward with the modification,” and in contrast, alternative methods of strengthening the woven scrim, such as increasing the thickness of polypropylene strands, may be used at minimal cost. *Id.* at 33–34 (citing Ex. 2020, 70:13–19; Ex. 2021 ¶¶ 96–97).

In its Reply, Petitioner responds that Patent Owner does not dispute Mr. Kaczkowski’s testimony that combining Lou with Goodacre to utilize oriented polypropylene would increase the tensile strength of Lou’s underlayment, and Dr. Daniels conceded that that premise is correct. Pet. Reply 18 (citing Ex. 1003 ¶ 95; Ex. 1022, 78:20–79:16). Further, Petitioner argues, notwithstanding Patent Owner’s criticisms, Mr. Kaczkowski’s testimony was based on his extensive experience in the development of numerous products, and question of commercial viability is not a prerequisite to obviousness. *Id.* at 19 (citing Ex. 2020, 69:13–70:19; *Ex parte Mouttet*, 2011 WL 1131338, at *3 (BPAI Mar. 29, 2011)). Thus,

Petitioner contends, Patent Owner fails to refute the motivation to combine identified by Mr. Kaczkowski. *Id.*

In its Sur-reply, Patent Owner replies that “there is no evidence of record that combining Lou with Goodacre will result in a less costly manufacturing process,” “because Mr. Kaczkowski did not perform even a cursory analysis to determine whether there is any truth to this statement.” PO Sur-reply 13. Patent Owner contends that a person of ordinary skill in the art “would perform this type of analysis before attempting to determine if Lou with Goodacre could be combined together successfully,” and “Petitioner has thus failed to meet its burden of demonstrating unpatentability and obviousness.” *Id.*

Having considered the parties’ respective arguments, we find that Petitioner’s contentions are supported by the evidence of record, and we find that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou and Goodacre. We disagree with Patent Owner’s suggestion it is insufficient that Mr. Kaczkowski opined that a person of ordinary skill would have evaluated the proposed combination based on the combined teachings of the asserted references. As the Supreme Court has explained,

When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103.

KSR, 550 U.S. at 421. Patent Owner does not dispute Goodacre’s teachings or that combining those teachings with Lou would increase the tensile strength of Lou’s underlayment, but appears instead only to fault Mr. Kaczkowski for not determining whether those solutions would be less expensive than other alternatives. Such arguments are not persuasive. Although, as cited above, Petitioner alleges in the Petition that a skilled artisan would have recognized cross-lamination as “a simpler, less costly way to manufacture a nonwoven reinforcing scrim . . . consistent with Lou” (Pet. 37), we find that is only one among several reasons identified by Petitioner and Mr. Kaczkowski for the combination (*see, e.g., id.* at 34–35 (additionally identifying increased tensile strength as a well-known benefit of orienting polyolefin fabric)), each of which is independently persuasive.

6. *Obviousness of Claims 20 and 34 over Lou and Curran*

Claim 20 depends from claim 1 and further recites “wherein the thermoplastic layer includes micro-perforations which allow the passage of air therethrough while preventing moisture from passing therethrough.” Ex. 1001, 7:11–14. As reproduced in Section II.D. above, claim 34 is an independent claim that includes that same limitation. *Id.* at 8:26–36. Notably, claim 34 does not include the limitation of claim 1 that the recited at least one layer of thermoplastic material be affixed to the script “by extrusion lamination.” *Compare id.* at 6:25–27, *with id.* at 8:30–32.

Petitioner contends that dependent claim 20 and independent claim 34 would have been obvious over Lou in view of Curran. Pet. 38–40 (citing Ex. 1012, Fig. 4, 1:56–60, 3:26–48; Ex. 1005, 3:59–64, 6:37–7:11; Ex. 1003 ¶¶ 106–110); *id.* at 21–24. In support of its arguments with respect to this ground, Petitioner relies on Lou for the teaching of the elements of base claim 1, as set forth in the asserted ground based on anticipation by Lou (*see*

supra §§ III.E.1.a, III.E.1.e), as well as in-common elements of claim 34, and further contends that “Curran teaches a roofing underlayment that is made breathable—*i.e.*, permeable to air, but not liquid—by micro-sized openings 30” having variable shape and size for permeability adjustment. *Id.* at 38 (citing Ex. 1012, Fig. 4, 3:26–48), 40. According to Petitioner, a person of ordinary skill in the art “would have been motivated to modify Lou’s underlayment with the micro-perforations taught by Curran to further Lou’s goal of preventing damage to the building structure.” *Id.* at 39 (citing Ex. 1003 ¶ 106). Moreover, Petitioner argues, “[s]uch a modification is consistent with Lou, which also discloses a vapor-permeable, liquid-impermeable underlayment. . . . [b]ut Lou does not teach Curran’s adjustability feature—*i.e.*, the ability to vary the ‘shape and size of the pierced openings’ for a given application.” *Id.* (quoting Ex. 1012, 3:26–48) (citing Ex. 1005, 3:59–64). According to Petitioner, “Lou explains that some of its embodiments, while vapor permeable, still ‘lacked sufficient moisture vapor transmission to be desired for underslatement,’” and “thus, a [person of ordinary skill in the art] would look to Curran to provide adequate vapor transmission in at least those embodiments.” *Id.* (quoting Ex. 1005, 6:37–7:11) (citing Ex. 1003 ¶¶ 108–109).

Patent Owner responds that Petitioner’s motivation to combine fails, alleging that there is no need to add microperforations as taught by Curran to Lou because Lou already discloses sheets that are “vapor-permeable, liquid impermeable and strong.” PO Resp. 34–35 (quoting Pet. 9) (citing Ex. 1005, 3:59–64; Ex. 2021 ¶ 101). According to Patent Owner, while “the Petition states that Curran’s ‘ability to vary the “shape and size of the pierced openings” for a given application’ would allow a [person of ordinary skill in the art] to vary the vapor transmission rate of the sheets in Lou to account

different clients,” “this ignores that Lou describes a number of different exemplary embodiments with varying levels of moisture vapor transmission and liquid water barrier properties.” *Id.* (quoting Pet. 39; Ex. 1012, 3:47) (citing Ex. 1005, 4:35–7:58; Ex. 2021 ¶ 103).

Patent Owner further contends, “while the Petition points to embodiments in Lou that ‘lacked sufficient moisture vapor transmission to be desired for [underlayment],’ it fails to point out that these embodiments were ‘test samples A-2 through A-6, B-1, B-5 and B-6,’” which Lou specifically states “are included in the example for comparison purposes.” *Id.* at 36 (quoting Ex. 1005, 6:38–43). According to Patent Owner, a person of ordinary skill in the art “would have used other test samples in Lou to achieve the desired moisture vapor transmission,” and “[t]here certainly is no reason why a [person of ordinary skill in the art] would add the micro-openings of Curran to certain samples of Lou as opposed to simply using the samples in Lou that did provide sufficient moisture vapor transmission.” *Id.* (citing Ex. 2021 ¶ 104). Still further, Patent Owner contends that “Lou expressly teaches that a sheet with a weight of 6.9 g/m² provides more moisture vapor transmission than a sheet with a weight of 11.4 g/m².” *Id.* (citing Ex. 1005, 5:40–45). Patent Owner contends that a person of ordinary skill in the art “would be able to use those measurements as a guide to create a membrane that had a given desired moisture vapor transmission without adding additional steps of creating mechanical holes using the process in Curran.” *Id.* (citing Ex. 2021 ¶ 105).

Finally, Patent Owner argues that “both the Petition and the Kaczkowski declaration ignore that Curran is directed toward micro-perforations in *asphaltic* materials” and “fail to address how the process of Curran . . . would need to change when applied to the thermoplastic material

in Lou.” *Id.* at 36–37 (citing Ex. 1012, 3:26–28; Ex. 2021 ¶ 106).

According to Patent Owner, the experimentation required to determine if and how Curran’s microperforations would work with Lou’s thermoplastic material would be greater than that required to adjust the membrane weight in Lou. *Id.* at 37 (citing Ex. 2021 ¶ 106).

Having considered the parties’ respective arguments, we find that Petitioner’s contentions are supported by the evidence of record, and we find that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou and Curran. We are persuaded by Petitioner’s arguments, supported by the testimony of Mr. Kaczkowski, that Curran teaches a degree of adjustability not taught by Lou, including the “the ability to vary the ‘shape and size of the pierced openings’ for a given application,” and that a person of ordinary skill in the art would have looked to Curran to provide adequate vapor transmission in certain insufficient embodiments described by Lou. Pet. 39–40 (quoting Ex. 1012, 3:26–48) (citing Ex. 1003 ¶ 107–110; Ex. 1005, 6:37–7:11). Although, as Patent Owner points out, Lou identifies only certain samples as “lack[ing] sufficient moisture vapor transmission” (Ex. 1005, 6:38–43), Patent Owner does not cite evidence that a person of ordinary skill would have found the other samples to have sufficient moisture vapor transmission for use in a given environment, for example, or sufficient coating weight for a desired application. We note, for example, that the only sample in Lou’s “Series A” test that Lou does not identify as lacking sufficient moisture vapor transmission is sample A-1, which has a coating weight of only 5.7 g/m². At minimum, applying Curran’s microperforations would allow for adjustability of vapor transmission in underlayments of a

given coating weight. Moreover, notwithstanding Patent Owner's contention that Curran describes "asphaltic" materials, we are not persuaded that applying micro-perforations as taught by Curran to thermoplastic material as taught by Lou would have been beyond the level of ordinary skill in the art at the time of the alleged invention.

7. *Obviousness of Claims 21 and 27–32 over Lou, Goodacre, and Ellison*

As reproduced in Section II.D. above, claim 21 is an independent claim directed to a "multi-layer waterproofing membrane for providing a weather-resistant barrier" that differs from the "roofing underlayment" of claim 1 in three regards, namely, by reciting that a reinforcing scrim "of cross-laminated, thermoplastic strands" rather than "of interwoven strands"; by reciting "a layer of thermoplastic material extruded to cover each side of the reinforcing scrim" rather than "at least one layer of thermoplastic material affixed to a side of the reinforcing scrim by extrusion lamination"; and by reciting that "the waterproofing membrane is positioned between a roof support structure and an overlayment." *Compare* Ex. 1001, 7:15–24, *with id.* at 6:21–27. Claim 27 depends from claim 21 and further recites "wherein the thermoplastic layers are co-extruded onto the reinforcing scrim." *Id.* at 8:4–6. Claim 28 depends from claim 21 and further recites "wherein the thermoplastic layers may include polyethylene or polypropylene." *Id.* at 8:7–9. Claim 29 depends from claim 21 and further recites "wherein the scrim comprises a mesh of individual, cross-laminated strands of thermoplastic." *Id.* at 8:10–12. Claim 30 depends from claim 21 and further recites "wherein the thermoplastic strands are formed from one of polyethylene, polypropylene, polyester, and nylon." *Id.* at 8:13–15. Claim 31 depends from claim 21 and further recites "wherein the

thermoplastic strands comprise oriented polypropylene.” *Id.* at 8:17–19. Claim 32 depends from claim 21 and further recites “wherein the thermoplastic strands comprise cross-laminated polyethylene tapes.” *Id.* at 8:20–22.

Petitioner contends that independent claim 21 and dependent claims 27–32 would have been obvious over Lou in view of Goodacre and Ellison. Pet. 41–45 (citing, e.g., Ex. 1005, code (57), 1:7–14, 1:36–41, 2:34–44, 2:66–3:7, 3:15–17, 3:23–33, 3:62–64, 4:43–44, 6:37–7:13, Fig. 1; Ex. 1010, 4:26–46; Ex. 1011, 1:44–58, 3:19–24; Ex. 1003 ¶¶ 19, 116, 118, 121, 123, 125, 126); *id.* at 25, 30–37. Patent Owner does not present separate arguments for claims 21 and 27–32. *See* PO Resp. 37. Having considered the parties’ respective arguments, we find that Petitioner’s contentions are supported by the evidence of record. Moreover, for the reasons set forth in our discussion of Petitioner’s grounds based on Lou and Goodacre and Lou and Ellison, we are persuaded that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou, Goodacre, and Ellison. *See supra* §§ III.E.4, III.E.5.

8. *Obviousness of Claims 22 and 23 over Lou, Goodacre, Ellison, and Büsscher*

Claim 22 depends from claim 21 and recites that the waterproofing membrane further comprises “a layer of slip-resistant material positioned over an outer surface of the waterproofing membrane, wherein the slip-resistant layer resists slipping in both wet and dry conditions.” Ex. 1001, 7:26–30. Claim 23 depends from claim 22 and further recites “wherein the slip-resistant material is formed from polypropylene.” *Id.* at 7:31–33.

Petitioner contends that dependent claims 22 and 23 would have been obvious over Lou in view of Goodacre, Ellison, and Büsscher. Pet. 46 (citing Ex. 1008, 4–5, Fig. 1; Ex. 1003 ¶¶ 127–128); *id.* at 25–27. Patent Owner does not present separate arguments for claims 22 and 23. *See* PO Resp. 37. Having considered the parties’ respective arguments, we find that Petitioner’s contentions are supported by the evidence of record. Moreover, for the reasons set forth in our discussion of Petitioner’s grounds based on Lou and Goodacre, Lou and Ellison, and Lou and Büsscher, we are persuaded that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou, Goodacre, Ellison, and Büsscher. *See supra* §§ III.E.2, III.E.4, III.E.5.

9. *Obviousness of Claims 24–26 and 33 over Lou, Goodacre, Ellison, and Simpson*

Claim 24 depends from claim 21 and recites that the waterproofing membrane further comprises “a radiant barrier layer for reflecting solar energy positioned adjacent to one of the layers of thermoplastic material.” Ex. 1001, 7:34–37. Claim 25 depends from claim 24 and further recites “wherein the radiant barrier layer is a metalized film.” *Id.* at 7:38–39. Claim 26 depends from claim 24 and further recites “wherein the radiant barrier layer is an aluminum coating applied to one of the layers of thermoplastic material.” *Id.* at 8:1–3. Claim 33 depends from claim 24 and further recites “wherein the radiant barrier layer improves the fire resistance of the multi-layer waterproofing membrane.” *Id.* at 8:23–25.

Petitioner contends that dependent claims 24–26 and 33 would have been obvious over Lou in view of Goodacre, Ellison, and Simpson. Pet. 47–48 (citing Ex. 1009, 1:20–21, 1:41–50, 3:11–19, Fig. 1; Ex. 1003 ¶¶ 129–

132); *id.* at 27–29. Patent Owner does not present separate arguments for claims 24–26 and 33. *See* PO Resp. 37. Having considered the parties’ respective arguments, we find that Petitioner’s contentions are supported by the evidence of record. Moreover, for the reasons set forth in our discussion of Petitioner’s grounds based on Lou and Goodacre, Lou and Ellison, and Lou and Simpson, we are persuaded that Petitioner has articulated sufficient reasoning with rational underpinnings (including support both from the cited prior art and from Mr. Kaczkowski’s testimony) to combine the relevant teachings of Lou, Goodacre, Ellison, and Simpson. *See supra* §§ III.E.3, III.E.4, III.E.5.

F. Howells-based Grounds

Petitioner additionally contends that claims 1–12, 15, 16, and 18 are anticipated by Howells; that claims 13, 14, 17, 21, and 27–32 are unpatentable over Howells in view of Goodacre; that claims 19, 20, and 34 are unpatentable over Howells in view of Curran; that claims 22 and 23 are unpatentable over Howells in view of Goodacre and Büsscher; and that claims 24–26 and 33 are unpatentable over Howells in view of Goodacre and Simpson. Pet. 49–72.

Because we conclude that the challenged claims are unpatentable on other grounds (*see supra* § III.E), we do not reach these additional grounds. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has “discretion to decline to

decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

G. Petitioner’s Motion to Exclude

Petitioner moves to exclude Exhibit 2025, which, as stated in footnote 11 above, consists of excerpts from the August 9, 2021, Opening Expert Report of Maureen T.F. Reitman, Sc.D., P.E. on Invalidity of U.S. Patent No 6,308,482 from *Kirsch Research & Development, LLC v. DuPont de Nemours, Inc.*, No. 5:20-cv-00057 (E.D. Tex.). Mot. Excl. 1–5. First, according to Petitioner, “Exhibit 2025 consists of statements made outside the course of this proceeding that Patent Owner relies upon for their truth, and it is therefore hearsay.” *Id.* at 1. More particularly, Petitioner alleges, Patent Owner offers for its truth Dr. Reitman’s statement that “[i]n extrusion coating, a molten polymer web may be applied to a moving substrate, while extrusion lamination may also involve a molten polymer to adhere two substrates to each other” (Ex. 2025 ¶ 54) in support of its argument that a person of ordinary skill in the art would understand that extrusion coating and extrusion lamination are different processes; Dr. Reitman is not a witness in this proceeding; and Dr. Reitman’s statement is therefore hearsay under Rule 801 of the Federal Rules of Evidence. *Id.* at 1–3. Second, according to Petitioner, “none of the exceptions or exemptions to [the] rule against hearsay applies.” *Id.* at 1. In particular, Petitioner argues, Exhibit 2025 does not satisfy any of the conditions set forth in Rule 803(1)–(23); Rule 804 exceptions do not apply because Dr. Reitman has not been shown to be “unavailable”; and this is not the sort of “exceptional” case in which Rule 807 exceptions apply. *Id.* at 4–5.

In its Opposition to the Motion to Exclude, Patent Owner contends that Exhibit 2025 is not hearsay and, even if it is hearsay, it “is the type of

hearsay routinely relied upon by experts, such as Patent Owner's expert Dr. Daniels, in reaching their opinions," and "[t]herefore Ex. 2025 should remain as evidence." Opp. Mot. Excl. 1. First, Patent Owner argues, Exhibit 2025 is not hearsay because "Patent Owner is not offering it for the truth of the matter asserted" but rather "to demonstrate the beliefs of an expert in the relevant field." *Id.* More specifically, Patent Owner asserts:

Ex. 2025 is offered to show what another expert believes a person of ordinary skill in the art would view an extrusion coating process and an extrusion lamination process. Ex. 2025 is not offered to demonstrate whether that understanding is correct, as that is for the Board to determine. Ex. 2025 is being offered to show what Dr. Reitman believed, as stated in her report. Thus, Ex. 2025 indicates the state of mind of another expert in the relevant art with respect to that expert's understanding of what a person of ordinary skill in the art would understand about the '482 patent and prior art.

Id. at 1–2. Second, Patent Owner argues, "[e]ven if the Board finds Ex. 2025 to be hearsay, it should not be excluded because experts, such as Dr. Daniels, routinely rely upon hearsay evidence in reaching their conclusions and are permitted to do so under the Federal Rules of Evidence." *Id.* at 3 (citing Fed. R. Evid. 703). Here, Patent Owner contends, "Dr. Daniels is relying upon the expert report of another regarding her understanding of how a person of ordinary skill in the art would interpret 'extrusion coating' and 'extrusion lamination.'" *Id.* Thus, Patent Owner argues, "Dr. Daniels' use of Ex. 2025 in reaching his opinions is proper and should not be excluded, even if the Board determines that Ex. 2025 contains hearsay." *Id.*

In its Reply in support of its Motion to Exclude, Petitioner responds that Patent Owner's assertion that Exhibit 2025 is not offered for its truth is "untenabl[e]," as "Patent Owner relied [in its Patent Owner Response] on

Dr. Reitman’s testimony in alleged support of a disputed fact—*i.e.*, how a [person of ordinary skill in the art] supposedly would have understood the meanings of ‘extrusion lamination’ and ‘extrusion coating.’” Reply Mot. Excl. 1 (citing PO Resp. 22). Further, Petitioner contends, “Patent Owner’s conflation of state-of-mind evidence with expert testimony would effectively shield all district court expert reports submitted to the Board from the rule against hearsay,” “[b]ut such a result would be improper because courts and the Board routinely treat expert reports and testimony as hearsay to the extent that they are, as here, offered for their truth.” Reply Mot. Excl. 2 (citing *Tubular Rollers, LLC v. Maximus Oilfield Prod., LLC*, No. 4:19-cv-03113, 2021 WL 5991744, at *3 (S.D. Tex. Dec. 16, 2021) (“An expert’s report is hearsay because it is an out of court statement offered to prove the truth of the matter asserted.”); *N5 Techs. LLC v. Cap. One N.A.*, 56 F. Supp. 3d 755, 765 (E.D. Va. 2014) (“To begin with, Christensen’s expert report is not admissible under an exception to the hearsay rule.”); *Denso Corp. v. Collision Avoidance Techs. Inc.*, IPR2017-01715, Paper 27 at 25 (PTAB Jan. 22, 2019) (“It is beyond reasonable dispute that the deposition testimony of [experts in other IPR proceedings] are hearsay in the proceeding before us.”)). Finally, Petitioner argues that “Rule 703 does not apply because Patent Owner has not shown that Dr. Reitman’s expert report is of the sort that experts in the field would reasonably rely on.” Reply Mot. Excl. 3 (citing Fed. R. Evid. 703).

Having considered the parties’ arguments, we grant Petitioner’s Motion to Exclude. Federal Rule of Evidence 801 defines “hearsay” as a “a statement that: (1) the declarant does not make while testifying in the current trial or hearing; and (2) a party offers in evidence to prove the truth of the matter asserted in the statement.” Fed. R. Evid. 801(c). We agree with

Petitioner that Patent Owner is offering Dr. Reitman's testimony for its truth. As Petitioner points out, Dr. Reitman's testimony is presented in the Patent Owner Response in alleged support of Patent Owner's argument. *See* Reply Mot. Excl. 1 (citing PO Resp. 22 ("Maureen Reitman recognized that 'extrusion coating' and 'extrusion lamination' were two different processes"; "[A]s Dr. [sic] Reitman recognized, a POSITA would understand 'extrusion coating' to be different than 'extrusion lamination.'")).

Further, Rule 802 provides that hearsay is not admissible unless a federal statute, the Federal Rules of Evidence, or other rules prescribed by the Supreme Court provide otherwise. Fed. R. Evid. 802. We agree with Petitioner that no exception or exclusion applies in this case. Mot. Excl. 1. Although, as Patent Owner contends, Federal Rule of Evidence 703 provides that "[a]n expert may base an opinion on facts or data in the case that the expert has been made aware of or personally observed," and that "[i]f experts in the particular field would reasonably rely on those kinds of facts or data in forming an opinion on the subject, they need not be admissible for the opinion to be admitted," we are not persuaded that opinions of others offered in litigation are the sort of "facts or data" that experts in the field of roofing underlayments would reasonably rely on in forming their own opinions.

IV. CONCLUSION

Based on the evidence presented with the Petition, the evidence introduced during the trial, and the parties' respective arguments, Petitioner has shown by a preponderance of the evidence that the subject matter of claims 1–33 of the '482 patent is unpatentable.

V. ORDER

It is hereby:

ORDERED that claims 1–33 of the '482 patent are determined to be unpatentable;

FURTHER ORDERED that Petitioner's Motion to Exclude is granted, and Exhibit 2025 is accordingly excluded; 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.

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 8–12, 19	102(b)	Lou	1, 8–12, 19	
2, 3	103(a)	Lou, Büsscher	2, 3	
4–6, 18	103(a)	Lou, Simpson	4–6, 18	
7, 15, 16	103(a)	Lou, Ellison	7, 15, 16	
13, 14, 17	103(a)	Lou, Goodacre	13, 14, 17	
20, 34	103(a)	Lou, Curran	20, 34	
21, 27–32	103(a)	Lou, Goodacre, Ellison	21, 27–32	
22, 23	103(a)	Lou, Goodacre, Ellison, Büsscher	22, 23	
24–26, 33	103(a)	Lou, Goodacre, Ellison, Simpson	24–26, 33	
1–12, 15, 16, 18	102(b)	Howells ¹³		

¹³ As explained above, we do not reach this ground. *See supra* § III.F.

13, 14, 17, 21, 27–32	103(a)	Howells, Goodacre ¹⁴		
19, 20, 34	103(a)	Howells, Curran ¹⁵		
22, 23	103(a)	Howells, Goodacre, Büsscher ¹⁶		
24–26, 33	103(a)	Howells, Goodacre, Simpson ¹⁷		
Overall Outcome			1–33	

¹⁴ As explained above, we do not reach this ground. *See supra* § III.F.

¹⁵ As explained above, we do not reach this ground. *See supra* § III.F.

¹⁶ As explained above, we do not reach this ground. *See supra* § III.F.

¹⁷ As explained above, we do not reach this ground. *See supra* § III.F.

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