

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

OMEGA LINER COMPANY, INC.
Petitioner,

v.

BUERGOFOL GMBH,
Patent Owner.

IPR2023-01372
Patent 9,657,882 B2

Before JEFFREY N. FREDMAN, GRACE KARAFFA OBERMANN,
and KIMBERLY McGRAW, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

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

ORDER
Denying Patent Owner's Motion to Exclude (Paper 51)
Denying Petitioner's Motion to Exclude Ex. 2001 (Paper 52)
Denying Petitioner's Motion to Exclude Ex. 2003 (Paper 53)
Denying Petitioner's Motion to Exclude Ex. 2004 (Paper 54)

I. INTRODUCTION

A. Background and Summary

Omega Liner Company, Inc. (“Petitioner”) filed a Petition (Paper 2, “Pet.”) seeking an *inter partes* review of claims 1, 3–7, and 10–13 of U.S. Patent No. 9,657,882 B2 (Ex. 1001, “the ’882 patent”). Buergofol GmbH (“Patent Owner”) did not file a preliminary response.

We instituted review of all claims based on all grounds set forth in the Petition. Paper 8 (“Institution Decision” or “Inst. Dec.”); *see* Pet. 24 (Petitioner’s identification of grounds). After institution, Patent Owner filed a Response (Paper 13, “Resp.”), Petitioner filed a Reply (Paper 24, “Reply”), and Patent Owner filed a Sur-reply (Paper 47, “Sur-reply”). The record includes the transcript of a final hearing conducted in person on December 17, 2024. Paper 83 (“Tr.”).

We resolve herein Patent Owner’s Motion to Exclude (Paper 51) and Petitioner’s Motions to Exclude (Papers 52–54). Concurrently herewith, we enter an Order that resolves Patent Owner’s Motion to Seal (Paper 74).

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a). For the reasons that follow, we determine that Petitioner demonstrates by a preponderance of the evidence that claims 1, 3–7, and 10–13 of the ’882 patent are unpatentable.

B. Real Parties in Interest

Petitioner and Patent Owner identifies themselves as the sole real parties-in-interest. Pet. 1; Paper 4, 2.

C. Related Matters

The parties identify *Buergofol GmbH v. Omega Liner Company, Inc.*, Case No. 22-cv-04112-KES (D. S.D.) (“the District Court action”) as a

related matter. Pet. 1; Paper 4, 2. Patent Owner further indicates that IPR2023-01402 (“IPR1402”) involves U.S. Patent No. 8,794,269 B2, which also is asserted in the District Court action. Paper 4, 2. We denied institution of review in IPR1402. *See* IPR2023-01402, Paper 11.

D. The ’882 Patent (Ex. 1001)

The ’882 patent is titled “Tubular Film and the Use Thereof” and describes a tubular film having “one or more layers.” Ex. 1001, codes (54), (57), 1:5–6. Tubular films are useful, for example, “in the tube lining process for trenchless sewage pipe renovation.” *Id.* at 1:14–15.

The ’882 patent specification describes a trenchless sewage pipe renovation process that employs “an insertion tube (tube liner)” that typically includes “an external tube (outer tubular film)” as well as “an internal tube (inner tube film).” *Id.* at 1:30–33. “Between them, a carrier material” that is “impregnated with reactive plastic resin is introduced.” *Id.* at 1:34–35. A polyethylene film, known as “[a] sliding film,” optionally may be “positioned tightly against the inner wall of the pipe” requiring renovation. *Id.* at 1:17–21.

During pipe renovation, “the insertion tube is inflated from the inside with compressed air against the mechanically stable inner tube film until the outer tube film presses tightly against the pipe’s inner wall or the sliding film.” *Id.* at 1:40–44. After the insertion tube is inflated, “the resin can be cured,” for example, by pulling a UV-radiation light source “through the interior of the inflated insertion tube.” *Id.* at 1:44–47. Thereafter, “the inner tube film of the insertion tube is pulled out and removed,” however, to do this properly, “a good release effect is necessary so the inner tube film can be pulled out without residues from the cured resin.” *Id.* at 1:47–50. This

arrangement “has been known for a long time” (*id.* at 12:23–24) and is depicted in Figure 1 from the ’882 patent, which we reproduce below.

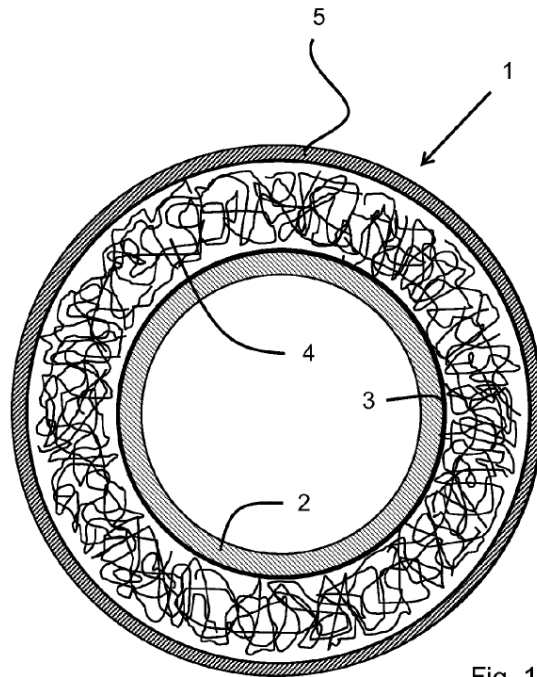


Fig. 1

Id. at Fig. 1. Figure 1 illustrates tube liner 1 in an inflated state, inner tube film 2, coating 3, resin carrier system 4, and outer tube film 5.

The claims specify “[a]n insertion tube” that includes, among other features, “an inner tubular film” having “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound.” *Id.* at 20:18, 20:31–33. Both the specification and claim 10 identify “wax” as an example of a “migrating compound.” *Id.* at 4:15–20; 21:17–19.

The ’882 patent specification also states that the tubular film of the invention “surprisingly” confers a number of “very good mechanical properties” to the pipe renovation system. *Id.* at 8:46–48. For example, according to the Specification, “[w]hen underground pipes are renovated, the tubular film” of the invention is “able to withstand very well the occurring

stresses, particularly when inflating it in the pipe system.” *Id.* at 8:53–56. Further, the specification explains, when the tubular film of the invention is used as the “inner tube film” of an inflation tube, the film confers an “excellent release effect” and “is sufficiently tear resistant” to be peeled off from the resin after curing “without leaving a residue” such that “no film fragments are left in the renovated sewage pipe.” *Id.* at 8:57–64.

E. Illustrative Claim

Petitioner challenges claims 1, 3–7, and 10–13 of the ’882 patent.
Pet. 1. Claim 1, reproduced below, is the only independent challenged claim.

1. An insertion tube suitable for use in trenchless sewage pipe renovation, comprising
 - [a] an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;
 - [b] an inner tubular film;
 - [c] a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and
 - [d] wherein the inner tubular film comprises:
 - one or multiple layers
 - an inner facing external side and an outer facing external side facing the carrier material;
 - [e] ***a coating of at least one of*** (1) a coating with a polysiloxane; ***or (2) a coating or covering with at least one migrating compound***; and
 - [f] wherein ***the coating is applied over*** a section of or an entire circumferential area of the outer facing external side facing the carrier material.

Ex. 1001, 20:18–36 (emphasis and bracketed letters added by the Board).
The other challenged claims depend directly or indirectly from claim 1 and,

therefore, inherit the emphasized limitation, which we refer to herein as “the coating limitation.” *Id.* at 20:42–21:5, 21:16–22:19 (claims 3–7 and 10–13).

For purposes of this Decision, it is important to recognize that the parties discuss whether the coating limitation is met by three, independent “coating or covering” alternatives, *id.* at 20:32, which we refer to in our claim construction analysis as the “three scenarios.” *See, e.g.*, Resp. 7. As explained in that analysis, we resolve the scope of the “three scenarios” only to the extent necessary to support our ultimate patentability conclusions.

F. Asserted Ground of Unpatentability

Petitioner asserts that claims 1, 3–7, and 10–13 of the ’882 patent are unpatentable on the following grounds.

Ground	35 U.S.C. § ¹	Claims Challenged	Reference(s)/Basis
1	102(b)	1, 4–7, 10, 11	Hummel ² ,
2	103	3	Hummel,
3	103	1, 3–7, 10–13	Hummel, Schuhmann ³
4	103	1, 3–7, 10, 11	Hummel, Nagai ⁴

Pet. 24.

¹ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (Sept. 16, 2011), includes revisions to Sections 102 and 103 that became effective on March 16, 2013. Because the challenged claims issued from an application filed before March 16, 2013, we apply the pre-AIA law to the challenges. *See* Ex. 1001, code (30); Pet. 14 (asserting an earliest priority date of March 11, 2013, based on the filing date of a foreign patent application). At this stage of the proceeding, we are directed to no information indicating that the result would change based on which version of the law is applied.

² WO 2011/157356, published Dec. 22, 2011 (Ex. 1005) (certified translation).

³ WO 2011/054434, published May 12, 2011 (Ex. 1007) (certified translation).

⁴ JP 2022001819A, published Jan. 8, 2002 (Ex. 1009) (certified translation).

G. Testimonial Evidence

The Petition is supported by the Declaration of Dr. Steven B. MacLean (Ex. 1003). Patent Owner's Response is supported by declarations of Dr. Patrick Brant (Ex. 2001), Gregor Schleicher (Ex. 2003), Abdel-Kader Boutrid (Ex. 2004), and David Clayberg (Ex. 2009), as well as deposition testimony of Dr. Steven MacLean (Ex. 2015). Petitioner's Reply is supported by (1) deposition testimony of Dr. Brant taken August 7, 2024 (Ex. 1052) and (2) declarations of Irina Hinrichs (Ex. 1056) and Nils Fuechtjohann (Ex. 1062).

II. ANALYSIS

A. Legal Standards

Petitioner bears “the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)); *see* 37 C.F.R. § 42.104(b) (requiring petitions to identify how the challenged claim is to be construed and where each element of the claim is found in the prior art patents or printed publications relied upon).

Petitioner advances four grounds; one based on anticipation and three based on obviousness. Pet. 24.

1. Anticipation

To prevail on the anticipation ground, Petitioner must demonstrate that a single prior art reference (here, Hummel) sets forth each and every element of the challenged claims, as set forth in the claims. *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987); *see Net MoneyIN, Inc. v. VeriSign*,

Inc., 545 F.3d 1359, 1371 (Fed. Cir. 2008) (anticipation requires not only that each claimed element must be present in the asserted reference, but also that the reference teaches the claimed “arrangement or combination” of those elements).

Importantly, the *Net MoneyIN* decision instructs that “arranged” means the reference “must clearly and unequivocally disclose the claimed [invention] or direct those skilled in the art to the [invention] without any need for picking, choosing, and combining various disclosures not directly related to each other by the teachings of the cited reference.” *Id.* at 1371 (citing *In re Arkley*, 455 F.2d 586, 587 (CCPA 1972)) (emphasis omitted, alterations in original).

2. *Obviousness*

A patent claim is unpatentable as obvious 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 to a person of ordinary skill in the art. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). We resolve obviousness based on underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when presented, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

The obviousness analysis typically concerns “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (requiring “articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”)). Petitioner cannot satisfy its burden of proving obviousness by “mere conclusory

statements,” but “must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.” *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016).

B. Level of Ordinary Skill in the Art

The level of ordinary skill in the art at the time of the invention is a factual determination that provides a primary guarantee of objectivity in an obviousness analysis. *Al-Site Corp. v. VSI Int’l Inc.*, 174 F.3d 1308, 1324 (Fed. Cir. 1999) (citing *Graham*, 383 U.S. at 17–18; *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718 (Fed. Cir. 1991)).

Petitioner, in the Petition, proposes that a person of ordinary skill in the art “would have at least a bachelor’s degree in Polymer Science and Engineering, Material Science and Engineering, or a related engineering field, combined with at least three years of experience in the formulation, manufacturing, and end-use performance of polymeric film and sheet products.” Pet. 3 (citing Ex. 1003 ¶ 23). Petitioner further states that “[a]lternatively, one skilled in the art could be a person with at least seven years of experience in the formulation, manufacturing, and end-use performance of polymeric film and sheet products, without possessing a bachelor’s degree in a related scientific or engineering discipline.” *Id.*

In the Response, Patent Owner states that it “adopts Petitioner’s description of” the hypothetical person of ordinary skill in the art. Resp. 11 (citing Ex. 2001 ¶ 11). We apply Petitioner’s unopposed definition because it is consistent with disclosures in the ’882 patent, the asserted prior art, and the declaration testimony of Dr. MacLean. *See* Ex. 1001, code (57) (Abstract), 1:10–2:49 (background of the claimed invention); Ex. 1005, code (57) (Abstract), 1 (description of field and background of Hummel’s

invention); Ex. 1007, code (57) (Abstract), 1 (description of field and background of Schuhmann’s invention); Ex. 1009, code (57) (Abstract), ¶¶ 1–6 (technical field and state of the art pertaining to Nagai’s invention); *see also* Ex. 1003 ¶ 40 (Dr. MacLean’s testimony).

That is the same definition we applied in the Institution Decision. *See* Inst. Dec. 6. Neither party explains why our ultimate conclusions on patentability would change under a different definition.⁵

C. Claim Construction

In an *inter partes* review, we interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b).” 37 C.F.R. § 42.100(b). Under this standard, we construe the claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*

We construe only terms in controversy, and then only to the extent necessary to resolve the controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017).

1. The “Migrating Compound” of Claim 1

As noted above, claim 1 requires a multilayer inner tubular film, having an outer facing external side, that comprises:

⁵ Patent Owner requests that we find further “that the background knowledge of” an ordinarily skilled artisan would not have included “recognition of any sticking or tearing problem with the Hummel film.” Resp. 12; *see id.* at 29–33 (citing Ex. 2003 ¶¶ 15–20; Ex. 2004 ¶ 13). Even if we were to accept that proposition, however, for reasons identified by Petitioner and explained in our analysis below, that proposition neither undercuts Petitioner’s showing of unpatentability nor tips the scales in favor of a finding that any objective evidence of nonobviousness outweighs Petitioner’s showing. Reply 1–15.

[e] ***a coating of at least one of*** (1) a coating with a polysiloxane; ***or (2) a coating or covering with at least one migrating compound***; and

[f] wherein ***the coating is applied over*** a section of or an entire circumferential area of the outer facing external side facing the carrier material.

Ex. 1001, 20:31–36 (Board’s emphasis).

As explained in more detail below, a central dispute in this case is whether, and under what circumstances, a migrating compound—which is *not directly applied to* (that is, deposited over) the surface of the facing external side of the carrier material, but rather, *migrates to* that surface—constitutes a “coating or covering” as specified in claim 1.

For reasons discussed below, we need not settle that particular dispute in order to resolve Petitioner’s challenges. *See Nidec Motor Corp.*, 868 F.3d at 1017. Nonetheless, we discuss that dispute in detail below to provide necessary context for the issues that are determinative.

2. *The Parties’ Positions*

The ’882 patent specification “discloses two embodiments relating to [the] ‘migrating compound’” feature of claim 1. Pet. 22 (citing Ex. 1001, 5:23–34). In Petitioner’s view, “[t]he first embodiment is where the migrating compound ‘is ***incorporated in*** that outermost layer of the one- or multilayered film to whose external side the migrating compound should migrate.’” *Id.* (citing Ex. 1001, 5:23–29). “The second embodiment is where ‘a coating with the migrating compound can be ***done on the external side*** in question.’” *Id.* (citing Ex. 1001, 5:30–34).

By way of support, Petitioner directs us to claim construction contentions advanced by Patent Owner in the District Court action. Pet. 23. Petitioner argues, “Patent Owner contends that subpart (2) of claim element

[1e] for ‘coating’ covers both the first embodiment and the second embodiment for the migrating compound.” *Id.* (citing Ex. 1035, 11–14; Ex. 1037 ¶¶ 15, 40). Petitioner further points to Patent Owner’s contention in the litigation “that a ‘coating’ includes an external layer that face[s] the resin, and this *external layer include[s] an amount of a migrating compound*, specifically EBS wax.”⁶ *Id.* 23 (citing Ex. 1039, p. 6).

Petitioner also asserts that Patent Owner’s “preliminary infringement contentions” regarding claim 7 contend “that a ‘coating’ is a ‘migrating compound *on the surface* of the inner tubular film.” *Id.* (citing Ex. 1039, 7). Petitioner also points out that “Patent Owner alleges in the District Court action “that ‘migrating compound’ includes a release ‘wax’ such as ‘EBS wax.’” *Id.* (citing Ex. 1033 ¶¶ 15, 28, 40; Ex. 1037 ¶¶ 15, 28, 40).

Petitioner thus contends:

Solely for this Petition, Petitioner applies Patent Owner’s expected construction for only claim element [1e] “coating”, where the term “coating” includes (1) a migrating compound *incorporated into* the outermost layer of the inner tubular film or (2) a migrating compound *applied over* the external side of the inner tubular film.

Id.

Patent Owner responds that “Petitioner proposes an incorrect construction of the term ‘coating’ as recited by the claims.” Resp. 12 (citing Pet. 23; Ex. 1003 ¶ 108). Patent Owner asserts that “Petitioner’s misconstruing of the claims naturally led to confusion of the PTAB in its institution decision.” *Id.*

In Patent Owner’s view, “the ’882 patent makes a clear distinction between the terms ‘coating’ and ‘covering,’ in which ‘coating’ refers to

⁶ EBS wax refers to ethylene bis-stearylamine. Pet. 8 (citing Ex. 1013 ¶ 75).

conventional coating techniques, and ‘covering’ refers only to the ‘covering’ that is formed when a migrating compound migrates to the surface of the polymer layer.” *Id.* at 12–13 (citing Ex. 2001 ¶¶ 18–23); *see also* Sur-reply 13–14 (stating “Petitioner’s assertion that the specification describes a ‘coating’ as being formed by migration of a migrating compound is incorrect”), *but also see id.* at 14 (stating the “term ‘coating’ . . . is used as a broad label to refer to the three embodiments encompassed by claim 1” including “a covering with a migrating compound”). In Patent Owner’s further view, “Petitioner’s construction of the term ‘coating’ is incorrect for at least three reasons.” Resp. at 13.

First, Patent Owner argues, “a claim must be construed in a manner that is at least consistent with the remaining portions of the claim” and, in that respect, “Petitioner focuses only on claim element 1[e], but ignores 1[f], which helps further to define the term ‘coating’ and which purposefully does NOT include the term ‘covering.’” *Id.* According to Patent Owner, “[t]here is nothing in the claim that mandates that the term ‘coating’ also include a ‘covering,’ which is what Petitioner’s construction requires.” *Id.* (citing Ex. 2001 ¶ 20).

Second, Patent Owner contends that “Petitioner’s claim construction does not consistently assign different meanings to different claim terms.” *Id.* at 14. In that regard, Patent Owner argues that “[t]he term ‘coating’ is a coating of either polysiloxane or a coating of a migrating compound” and “is used in its well-known and conventional context, which includes coating the

external surface of the external layer with a polysiloxane and/or a migrating compound.”⁷ *Id.* (citing Ex. 2001 ¶ 23) (emphasis omitted).

Patent Owner continues, arguing that “[t]he claim term ‘covering,’ however, is not a coating in the context of the ’882 patent, but rather is formed by adding a migrating compound to the external film layer, which then migrates to the surface.”⁸ *Id.* Patent Owner further asserts that the coating limitation of claim 1 embraces a coating of a “polysiloxane or migrating compound (e.g., wax)” that is “applied in a conventional manner” over a surface or, “in an alternative embodiment,” the coating limitation of claim 1 “*is achieved by ‘additivation’ of a migrating compound to the external layer from which it migrates to the surface to form a covering.*” *Id.* (Board’s emphasis).

Third, Patent Owner contends, “Petitioner’s interpretation of the term ‘coating’ is not consistent with the use of that term in the patent specification as originally filed, the prosecution history, and the prosecution history of foreign patents in the same family.” *Id.* According to Patent Owner:

A proper construction of the claims is that the outer facing external side of the inner tubular film facing the curable resin includes ***either a coating*** that is “applied” over a section of or an entire circumferential area, ***or a covering*** that is formed by

⁷ These are the first and second scenarios discussed in the next subpart of our analysis, both of which relate, for lack of a better description, to a coating “painted on” a surface (as opposed to a coating or covering formed by migration of a migrating compound to a surface). Tr. 8:15–21.

⁸ In other words, the word “covering” in claim 1, according to Patent Owner, specifically relates to a third scenario in which a migrating compound, added to the material of a film, subsequently migrates to the surface of the film—adding a temporal feature to this apparatus claim.

adding a migrating compound to the external layer, which then migrates to the surface to form a covering.

Id. at 14–15 (Board’s emphasis).

Patent Owner asserts its “construction is consistent with the specification, including the original German language application, the prosecution history, and the prosecution history of the European counterpart application.” *Id.* at 15 (citing Ex. 1001, 4:15–20; Ex. 2001 ¶ 18). Patent Owner continues, arguing that “[t]he specification clearly delineates between coating and covering where the thickness of the covering can be orders of magnitude smaller than the thickness of the coating.” *Id.* at 16. “This would be reasonably expected by” an ordinarily skilled artisan “because a covering created by a compound added to a polymer film that migrates to the surface will be present in far lower amounts than the same amount of the compound ‘coated’ on the surface after film formation.” *Id.* (citing Ex. 2001 ¶ 19).

Patent Owner also directs us to the prosecution history of corresponding EP application EP2777925. *Id.* at 17. Patent Owner contends:

The examples in the ’882 patent would have informed a [person of ordinary skill in the art] that an amount of additive, such as wax, added in a small amount to the polymer forming the external layer would not be considered to be a “coating” because it is not applied over the surface of the external layer, and would also not be considered to form a covering, even if a small amount of the wax migrated to the surface.

Id. at 20 (citing Ex. 2001 ¶ 15).

According to Patent Owner:

Under the proper construction of the ’882 patent claims, the outer facing external side of the inner tubular film that faces the carrier material may contain one of the following:

1. a coating with a polysiloxane;
2. a coating with a migrating compound; or

3. a covering with a migrating compound that is added to the outer polymer layer and migrates to the surface.

Id. at 23 (citing Ex. 2001 ¶ 22).

For the purposes of this Decision, it is important to recognize that the parties agree that the coating limitation of claim 1 is met under the second scenario, where “a coating . . . with at least one migrating compound” is “applied over” (deposited on, as opposed to migrating to) the surface of the article of claim 1.⁹ Ex. 1001, 20:32–34; *see* Pet. 23; Resp. 14–15.

3. *The Three Scenarios Relating to the Coating Limitation*

A core dispute in this proceeding involves the scope of the coating limitation of claim 1:

[e] **a coating** of at least one of (1) a coating with a polysiloxane; or (2) **a coating or covering** with at least one migrating compound; and [f] wherein **the coating is applied over** [...] the outer facing external side.

Ex. 1001, 20:31–36 (emphasis and bracketed lettering added by the Board).

In Patent Owner’s view, claim 1 presents three possible ways of meeting the coating limitation. Sur-reply 14. The first is by application of “a coating of polysiloxane” over the specified surface. Ex. 1001, 20:31–36. The second is by application of “a coating” that contains “at least one migrating compound” over the specified surface. *Id.* The parties do not dispute these first and second scenarios, which, for lack of a better visual description, we

⁹ We need not and, therefore, do not resolve whether an ordinarily skilled artisan “would have understood the term ‘covering’ to be a type of ‘coating,’” or whether a coating differs from a covering based on “a preferred minimum thickness.” Pet. 22; Ex. 1001, 7:6–10; Ex. 2001 ¶ 25.

refer to as “painting on” a coating with a polysiloxane or migrating compound over the specified surface.¹⁰ Tr. 39:3.

A core dispute (which, ultimately, we need not resolve) relates to the scope of the third possible way of meeting the coating limitation; namely, by providing a “covering with at least one migrating compound.” Ex. 1001, 20:31–36. The parties dispute whether a “covering” and a “coating” differ in terms of structure and how much of a “migrating compound” must migrate to the appropriate external surface to form a “covering” within the scope of claim 1. *Id.* at 20:32.

In that sense, the third scenario introduces a temporal aspect to claim 1, whereby claim 1 is met only after some sufficient but unspecified degree of migration occurs to form a “covering,” which, after sufficient migration, may or may not be structurally distinguishable from a “coating” that is “applied over” an article. *Id.* at 20:31–36. The dispute concerns whether the use of two different terms in claim 1 (“coating” and “covering”) denotes different structures (for example, different thicknesses) or different methods of forming a structure (by painting on, or, alternatively, by migration to, the pertinent surface).

For reasons explained in our analysis of the challenges, we need not and, therefore, do not resolve the parties’ dispute about this third scenario, which consumes the greater part of the trial briefing and was the focus of the final hearing. In the next section, however, we set forth an overview of that dispute, which provides necessary context for understanding the issues that are, in fact, ultimately determinative in this proceeding.

¹⁰ During the hearing, Petitioner emphasized its claim construction position as advanced in the District Court action but clarified that it accepts Patent Owner’s “alternative construction” for purposes of this review. Tr. 11:6–12.

4. *Overview of the Disputed Third Scenario*

Regarding the disputed third scenario, by which a compound migrates to form a covering, Patent Owner submits that it is “very difficult” to define the term “covering” or “coating” because it is unknown how many molecules it takes to create a “covering” or “coating”:

It depends per -- the thing is, it's not defined because it's chemical arts, and it's very difficult. . . . The covering [and coating]¹¹ can only be functionally defined. You're never going to see it and say, yeah, there it is. It forms one molecule at a time, but one molecule is not sufficient.

Tr. 47:20–25.

According to Patent Owner, the only way for an ordinarily skilled artisan to know whether they have obtained a “covering” via compound migration is to conduct a release force test and compare the test data with the minimum release force data listed in column 17 of the '882 patent. *Id.* at 43:4–23. In Patent Owner's view, that data in column 17 represents a functional definition set forth in the specification, which is imported into claim 1 based on the word “covering” alone:

JUDGE MAYBERRY^[12]: We're getting [the described functional definition] in Claim 1 from the single word cover[ing]. Is that correct?

[Counsel for Patent Owner]: Yes, covering has that meaning. It's the same as coating.

Id. at 48:1–4.

Petitioner counterargues that the words of claim 1 are silent on any minimum thickness that is necessary to obtain a “covering” or “coating”

¹¹ Though Patent Owner only discusses a “*covering*” in this passage, its reasoning applies equally to a “*coating*.” Tr. 48:3–4.

¹² Judge Fredman replaced Judge Mayberry after the final hearing. Paper 84.

from a migrating compound and, further, submits that Patent Owner's proposed construction fails to adequately notify potential infringers:

[T]here is nothing in claim 1 that talks about a minimum amount of migrating compound incorporating the layer or any minimum thickness to form a coating or covering. . . .

And to [Patent Owner's] argument about release effect, the patent is silent. It doesn't have anything in it about a minimum release effect created by the coating or covering. [Patent Owner] gives examples, B4, B5, B6, but there's nothing in the '882 Patent that would tell a potential infringer, well, you have to have this amount of release effect to infringe or be below that to avoid infringement. There's nothing in the patent that tells us that.

Id. at 49:19–50:2.

Petitioner further points out that Patent Owner fails to identify language within claim 1 or column 17 of the specification that supports adequately importing into the claim a functional definition of “covering,” which would require conducting a “release force test” and comparing the test data with the minimum release force data listed in column 17. *Id.* at 47:20–48:5, 49:18–50:3.

An inventor may define claim terms by acting as their own lexicographer, but any such 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). Neither in the briefing nor at the final hearing did Patent Owner direct us to language demonstrating such clarity, deliberateness, or precision.

Further, aside from importing the release force test results from the specification into claim 1, Patent Owner offers no explanation for how an ordinarily skilled artisan would resolve, with any certainty, the degree of compound migration necessary to obtain a covering within the scope of

claim 1. *See* Tr. 47:9–21. Upon questioning on that specific point, Patent Owner explained that such a determination is “very difficult” and, further, that Patent Owner’s own attempts to resolve whether migration sufficient to form a covering had occurred—without using release force tests and instead employing “different types of microscopes”—were not successful. *Id.*

Against that backdrop, we determine that Patent Owner admits it is not possible to define how much of a migrating compound must reach an external surface to constitute a “covering” without importing a functional definition into claim 1. Resp. 20 (citing Ex. 2001 ¶ 13); Tr. 45:19–46:10, 47:9–21, 47:23–26.

5. *Declining to Resolve the Dispute
Surrounding the Third Scenario*

After thoroughly reviewing Patent Owner’s and Petitioner’s arguments and evidence on point, we determine that we need not and, therefore, do not resolve the dispute surrounding the third scenario, even though it is central to the briefing and was a focus of the final hearing.

That is because, as explained in the analysis that follows, the grounds of unpatentability based on Hummel alone (Grounds 1 and 2) fail for reasons unrelated to the disputed third scenario. Furthermore, the grounds based on Hummel and Schuhmann (Ground 3) or Nagai (Ground 4) independently succeed without any need for resolution of the disputed third scenario, because those grounds relate to the undisputed second scenario, under which a migrating compound, such as wax, is applied over (colloquially, “painted on”) the surface specified in claim 1. Finally, weighing the objective indicia of nonobviousness against the evidence of unpatentability does not require a resolution of the dispute surrounding the third scenario.

D. Assessment of the Patentability Challenges

We begin our assessment of the challenges with an overview of the asserted prior art references. We then turn to Petitioner’s asserted grounds of unpatentability. *See* Pet. 24 (identification of Grounds 1–4).

1. Hummel

Hummel is titled “Multi-Layer Film Permeable to UV Radiation” and published December 22, 2011, from an international application filed May 31, 2011. Ex. 1005, codes (54), (43), (22). Hummel indicates that its disclosure:

relates to a liquid-tight multilayer film which is at least partially permeable to UV radiation, preferably in the form of a tubular film, comprising a layer sequence consisting of a layer (a) based on at least one thermoplastic olefin homo- or copolymer as one of the outer layers, an adhesion promoter layer (b), an inner layer (c) based on at least one homo- and/or copolyamide, an adhesion promoter layer (d), a layer (e) based on at least one homo- and/or copolyamide as one of the outer layers, wherein the thermoplastic olefin homo- or copolymer of the layer (a) has a VICAT softening temperature of at least 100°C, the use of such a multilayer film as an inner tube of an insertion tube for the repair of underground pipes, such an insertion tube and a pipe repair system suitable for the repair of underground pipes, preferably underground sewer pipes.

Id. at 4.¹³

By way of background, Hummel describes a “known method for repairing underground pipes, a flexible insertion tube is provided that is pulled into the pipe to be repaired” wherein the “insertion tube comprises two tubes, preferably plastic tubes, of different diameters, between which is

¹³ Where the pagination added by a party differs from the original pagination of an exhibit, we refer to page numbers added by a party.

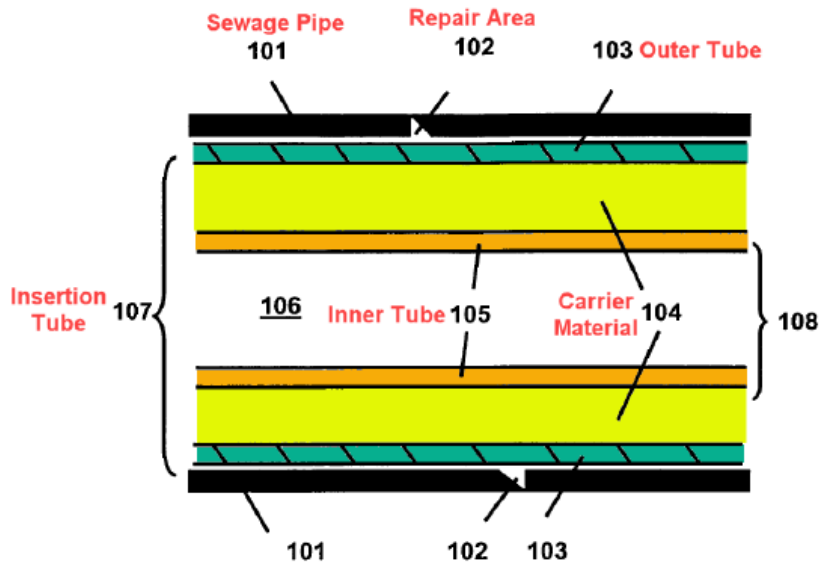
inserted a carrier material impregnated with a reactive plastic resin.” *Id.* at 5. Hummel explains that “[h]igh mechanical requirements are placed on the inner tube of such an insertion tube or on a corresponding, preferably tubular, multilayer film used for the repair of pipes” and that a disadvantage of certain prior art tubes is that “they do not have the necessary mechanical properties to withstand the loads described above.” *Id.*

To address that problem, Hummel discloses “a multilayer film, in particular in the form of a tubular film” that “is suitable as the inner tube of an insertion tube for the repair of underground pipes, preferably underground sewer pipes, because it has both the necessary permeability to UV radiation and such good mechanical properties that it can withstand the high loads occurring during pipe repair.” *Id.* at 6. Hummel’s “liquid-tight multilayer film” is “preferably in the form of a tubular film comprising a layer sequence of:”

- (a) a layer (a) based on at least one thermoplastic olefin homo- or copolymer as one of the outer layers,
- (b) an adhesion promoter layer (b),
- (c) an inner layer (c) based on at least one homo- and/or copolyamide,
- (d) an adhesion promoter layer (d),
- (e) a layer (e) based on at least one homo- and/or copolyamide as one of the outer layers or surface layers, wherein the thermoplastic olefin homo- or copolymer of layer (a) has a VICAT softening temperature of at least 100°C.

Id.

We reproduce below Petitioner’s annotated version of Hummel’s Figure 1.



Pet. 17. Figure 1 “shows an example of a longitudinal section through an insertion tube (107) according to the invention after insertion into a tube (101) having an area (102) to be repaired.” Ex. 1005, 15.

Hummel discloses that “[t]he insertion tube comprises a liquid-tight, UV radiation and/or short-wave visible light absorbing and/or reflecting outer single- or multilayer tubular film as an outer tube (103)” and “a liquid-tight preferably non-conditioned multilayer film according to the invention, preferably in the form of a tubular film, as an inner tube (105) and a carrier material (104) impregnated with a reactive plastic resin therebetween.” *Id.*

Hummel further teaches that, after the insertion tube (107) has been inflated to the diameter of the tube (101), it has “a cavity (106) into which a UV radiation and/or shortwave, visible light-emitting, preferably movable source, preferably a UV lamp, can be introduced, which causes the carrier material (104) impregnated with a reactive plastic resin to cure.” *Id.* According to Hummel, “[t]he repaired pipe (108) is formed from this impregnated carrier material (104) after curing and, if necessary, after removal or extraction of the internal tube (105).” *Id.*

2. *Schuhmann*

Schuhmann is titled “Adhesive Products Having an Embossed Release Film” and published May 12, 2011, from an international application filed October 13, 2010. Ex. 1007, codes (54), (43), (22). Schuhmann “relates to an adhesive product provided with a release film, comprising at least one layer (a) based on at least one thermoplastic polymer” and wherein at least one of the surfaces of the thermoplastic polymer “has a finish based on at least one lipophilic compound, wherein said film has an embossed structure at least where it is in contact with the tacky product.” *Id.* at 4.

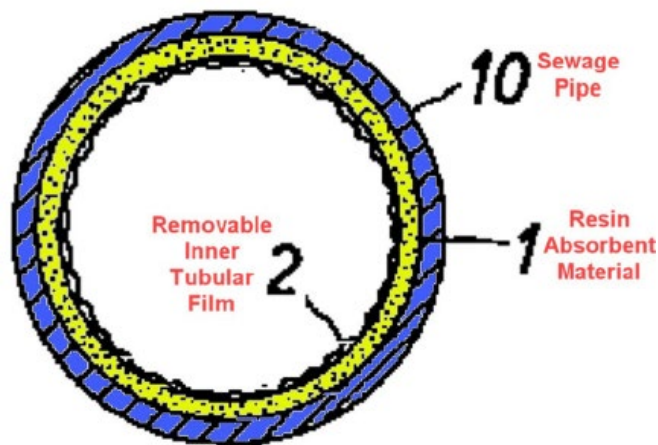
Schuhmann instructs, “Release films that are siliconized on at least one side to achieve their release effect are already known” in the prior art. *Id.* Schuhmann identifies known “release films” in which a “carrier layer contains waxy additives or is coated with such additives. *Id.*

3. *Nagai*

Nagai is a Japanese patent application titled “Tube Lining Method and Tube Lining Material and Manufacturing Method Thereof” and published January 8, 2002. Ex. 1009, codes (54), (43).

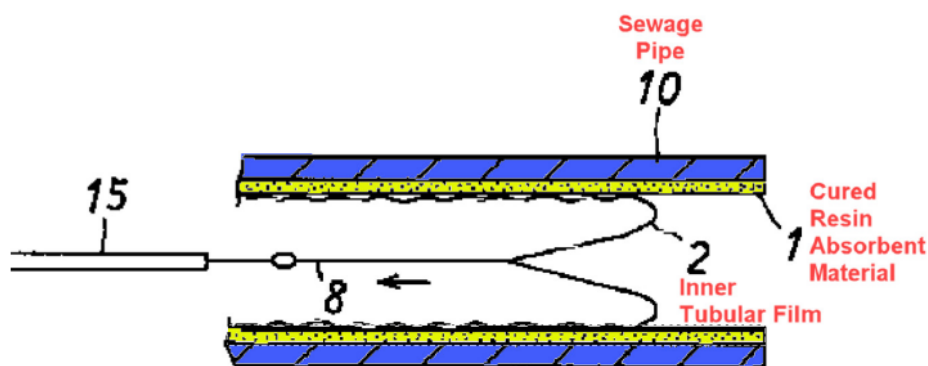
Nagai “relates to a tube lining method for repairing an aging conduit, etc., a tube lining material suitable for use in such a tube lining method, and a method for manufacturing the same.” *Id.* ¶ 1. Nagai describes a tube lining method wherein a tubular resin absorbent material is impregnated with liquid-like curable resin and passed through a tubular thin film that is highly airtight. *Id.* ¶ 10. The resin absorbent material is impregnated with liquid-like curable resin without adhering the thin film to the outer surface of the resin absorbent material. *Id.* After inserting this material while inverting it into the conduit by means of fluid pressure, the curable resin impregnated

into the resin absorbent material is cured, and after curing, the thin film is removed from the inside of the resin absorbent material. *Id.*



Pet. 21. Figure 10 is a “[s]chematic cross-sectional view of the conduit with inverted pipe lining material inserted thereto.” Ex. 1009, 9. Figure 10 depicts a resin absorbent material 1, conduit 10 (Petitioner identifies this as a “sewage pipe”), and a thin film 2 (Petitioner identifies this as a “removable inner tubular film”). *Id.*

We reproduce below Petitioner’s annotated version of Nagai’s Figure 11.



Pet. 21. Figure 11 is a “[s]chematic drawing showing an example of pulling a thin film from within a conduit.” Ex. 1009, 9. Figure 11 depicts resin

absorbent material 1, thin film 2, conduit 10, and “Hot water holes (concurrently used for extracting thin films)” 15. *Id.* at 10–11.

4. *Alleged Anticipation by Hummel (Ground 1)*

Petitioner identifies with particularity disclosures in Hummel that allegedly teach each feature of the claimed invention. Pet. 25–36. For two alternative reasons, however, we find Petitioner fails to show by a preponderance of the evidence that Hummel anticipates independent claim 1 and, therefore, fails also to carry its burden with respect to claims 4–7, 10, and 11, each of which depends directly or indirectly from claim 1.

a) *Hummel’s Asserted “Laundry List” of Optional Additives*

Claim 1 recites, in part, an inner film having “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least **one migrating compound.**” Ex. 1001, 20:31–33 (Board’s emphasis).

To teach an inner film having a coating or covering with a “migrating compound” as recited in claim element [1e], Petitioner cites to a paragraph in Hummel that discloses a choice to incorporate certain additives into one or more of Hummel’s layers (a)–(e):

The layers (a), (c) and (e) and the adhesion promoter layers (b) and (d) of the multilayer film according to the invention can, if necessary, in each case independently of one another, be treated with additives selected from the group comprising antistatic agents, antioxidants, **ant[i]blocking agents**, antifogging agents, antimicrobial agents, dyes, color pigments, stabilizing agents, preferably heat stabilizers, process stabilizers, processing aids, flame retardants, nucleating agents, crystallizing agents, preferably crystal nucleating agents, **lubricants**, optical brighteners, flexibilizers, sealing agents, plasticizers, silanes, spacers, fillers, peel additives, **waxes**, wetting agents, **surface-**

active compounds, preferably **surfactants**, and **dispersants**, provided that such additives do not impair UV transmission.
Ex. 1005, 11:18–26 (Board’s emphasis).

A person of ordinary skill in the art, equipped with this disclosure, would face choices not only about which of these additives to select, but also, about which one, or more, of Hummel’s five distinct layers (that is, Hummel’s layers (a)–(e)) should be chosen for addition of any particular selected additive. *Id.*

Petitioner asserts that an ordinarily skilled artisan would recognize that the bolded additives above are “migrating compounds” that migrate to an external surface of a plastic film. Pet. 28 (citing Ex. 1003 ¶¶ 64–65). On that point, Petitioner observes, the ’882 patent treats wax as a migrating compound and, in the District Court action, Patent Owner has asserted that a “migrating compound” includes “wax.” *Id.* at 28–29 (citing Ex. 1037 ¶¶ 15, 28, 40; Ex. 1001; *e.g.*, Ex. 1001, 4:15–19, 5:39–67; Ex. 1003 ¶¶ 130–132).

In its Response, Patent Owner asserts that “the disclosure of a large laundry list of potentially thousands of possible additives cannot inherently anticipate claims 1, 4–7, 10 or 11.” Resp. 39 (referencing *Ex Parte Smith*, Appeal 2011-00337, application No. 11/890,109, BPAI Decision dated February 28, 2012) (informative)).

Patent Owner argues that Petitioner impermissibly relies on “Hummel’s disclosure of a laundry list of additives” (Ex. 1005, 11:18–26, reproduced above) “as allegedly disclosing or ‘anticipating’ element [1e] of the Challenged Claims.” *Id.* at 40–41. Patent Owner points out further that claim limitation [1e] specifies “*at least one migrating compound*,” yet, Hummel (at Ex. 1005, 11:18–26, reproduced above) does not identify any of the possible additives as a migrating compound. *Id.* at 41–42 (citing Ex.

2001 ¶ 49). Patent Owner further states that, although “waxes are known migrating compounds, waxes are used for many purposes other than to migrate to the surface of a polymeric film.” *Id.* at 42.

In Patent Owner’s view, even if an ordinarily skilled artisan would have been led to select wax from the list of “about 28 generic additives,” the wax must be selected to perform the function of a “*migrating compound*.” *Id.* (citing Ex. 2001 ¶ 48). In addition, after selecting a wax that performs that function, Patent Owner contends, an ordinarily skilled artisan must also choose to add the wax to the correct layer of Hummel, namely, layer (e). *Id.* Patent Owner concludes by stating that Hummel does not disclose any examples using any of the additives list in Hummel (Ex. 1005, 11:18–26) and, further, argues that no teaching in Hummel would “specifically direct” an ordinarily skilled artisan “to make the selection proposed by Petitioner.” *Id.* at 42–43.

In its Reply, Petitioner asserts that the ’882 patent’s specification teaches that a migrating compound encompasses a wide range of possible substances:

[Patent Owner] argues a [person of ordinary skill in the art] would not know which additive to choose from a “large laundry list” of possibilities. (POR, p.39.) This does not change the fact that all are nonetheless taught. Indeed, other than dependent claim 10, the claims do not specify any type of migrating compound, presumably acknowledging such varied options, and the specification broadly describes “migrating compound” offering no boundaries whatsoever on what qualifies. (EX1001, 5:35-6:29).

The specification teaches that a wide range of substances, “*preferably* [with] a molecular weight lower 10,000 g/mol,” could be used, but provides no definitive limits.

Reply 25 (Petitioner’s emphasis and alterations).

Petitioner also contends that “Hummel teaches that the external layer (e) may, ‘if necessary,’ be treated with migrating compounds such as ‘lubricants’ and ‘waxes’ from ‘0.01-20% by weight’” and that an ordinarily skilled artisan “would have readily understood the need to add well-known lubricants or waxes to the external layer (e) of Hummel to achieve a release effect for film removal. *Id.* (citing Ex. 1003 ¶¶ 126–134; Ex. 1005, 11:18–12:4).

In its Sur-reply, Patent Owner reiterates that Hummel discloses a large list of possibilities and does not describe any as a migrating compound:

Rather, to arrive at the claimed coating or covering, a [person of ordinary skill in the art] must first make the optional selection to add [an] additive, (1 out of 2), then must make the optional selection to add that additive to outer layer (1 out of 5), and then must select a migrating compound from the unlimited number of additives disclosed (1 out of many).

Sur-reply 7.

We agree with Patent Owner that Petitioner relies on a list of optional additives set forth in Hummel—a list that Hummel provides without any guidance as to why any particular additive would have been selected to serve any purpose, specifically in relation to the relevant layer (e). *See* Ex. 1005, 11:18–26 (relevant disclosure in Hummel). In other words, Hummel’s disclosure does not teach, with anticipatory specificity, a multilayer film in which a migrating compound is selected specifically for addition to layer (e).

Although the lack of a specific example is not necessarily fatal to this anticipation ground, we cannot properly find that Hummel anticipates claim 1 absent some disclosure that “clearly and unequivocally” teaches the claimed subject matter “or direct[s] those skilled in the art to the” claimed

invention “without any need for picking, choosing, and combining various disclosures.” *In re Arkley*, 455 F.2d at 587 (emphasis omitted).

To be clear, Hummel may still anticipate claim 1, if Petitioner directs us to persuasive evidence that the number of possible combinations suggested by its list of optional additives is so limited that an ordinarily skilled artisan “would at once envisage the claimed arrangement or combination.” *UCB, Inc. v. Actavis Laboratories UT, Inc.*, 65 F.4th 679, 688 (Fed. Cir. 2023) (citing *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015); *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1274 (Fed. Cir. 2017)) (internal quotations omitted). Petitioner does not do so, however, as we are directed to no persuasive evidence that an ordinarily skilled artisan “would at once envision” selecting “wax” or another asserted migrating compound from among the list of additive categories provided, much less adding that particular additive to layer (e) as opposed to a different layer of Hummel’s multilayer film. Pet. 28.

As Patent Owner persuasively argues, Petitioner’s reliance on the list of optional additives set forth in Hummel (Ex. 1005, 11:18–26) to arrive at the claimed “migrating compound” requires a significant amount of picking and choosing. Resp. 39–43; Sur-reply 7–8. An ordinarily skilled artisan must first choose to use an optional additive. The artisan must then choose correctly an additive from Hummel’s list that satisfies the specified “migrating compound” limitation. Then, the artisan must choose to include that migrating compound in the correct layer, specifically, layer (e), from among Hummel’s multiple layers (a)–(e).

Regarding the selection of an additive, as noted above, Hummel, lists a great number of categories of additives, including:

antistatic agents, antioxidants, antiblocking agents, antifogging agents, antimicrobial agents, dyes, color pigments, stabilizing agents, preferably heat stabilizers, process stabilizers, processing aids, flame retardants, nucleating agents, crystallizing agents, preferably crystal nucleating agents, lubricants, optical brighteners, flexibilizers, sealing agents, plasticizers, silanes, spacers, fillers, peel additives, waxes, wetting agents, surface-active compounds, preferably surfactants, and dispersants, provided that such additives do not impair UV transmission.

Ex. 1005, 11.

Petitioner does not provide persuasive argument or evidence that an ordinarily skilled artisan would at once envisage picking one of the asserted migrating compounds from this long list of additives. Dr. Maclean states that “[o]f the additives listed by Hummel,” the ordinarily skilled artisan “would have considered at least antiblocking agents, lubricants, waxes, and surfactants to be well-known migrating compounds.” Ex. 1003 ¶ 129 (citing *id.* ¶¶ 63–68). Although Petitioner asserts that Hummel’s list contains “less than 25 additives” and “three of them” would have been known to “create the release effect” desired in the ’882 patent (Tr. 19:14–19), Patent Owner’s counterargument—that Hummel’s list requires “a selection of one out of 140” alternatives—has merit.¹⁴

Further, at a key point in its analysis, Petitioner refers the Board to the disclosure of the ’882 patent, which “extensively discusses how ‘wax’ is a ‘migrating compound’” useful “as an additive to the outer layer of” an

¹⁴ In Patent Owner’s counterview, Hummel’s list includes “about 28 generic additives” that optionally may be added to any one of the five layers of Hummel’s multilayer film, requiring “a selection of one out of 140” possible alternatives. Resp. 42; *see also* Ex. 2001 ¶ 48 (testifying that “the selection must be made from a very large list of possible additives, and then the additive would have to be added to the outer layer (e) of the film”).

“inner tubular layer.” Pet. 28 (and citations to Ex. 1001). But an ordinarily skilled artisan would not have been informed by that disclosure from the challenged patent. Petitioner’s heavy reliance on the disclosure of the challenged patent—to support why an ordinarily skilled artisan would have been prompted to select a migrating compound from among Hummel’s list of 25 or more optional additives, specifically for inclusion in layer (e) of Hummels’ multilayer film—significantly weakens Petitioner’s argument that Hummel is an anticipatory reference. *Id.*

For example, when addressing the *specific arrangement* required by claim 1 (namely, the arrangement in which Hummel’s layer (e) is selected, from among five layers (a) through (e), for inclusion of a wax (Ex. 1005, 11:18–19)), Petitioner directs us to disclosures in the challenged patent and extrinsic opinion testimony, neither of which is adequate to fill the gap in Hummel’s disclosure. Reply 25 (citing Ex. 1003 ¶¶ 126–134); Pet. 28 (citing disclosures of challenged patent (Ex. 1001) and Ex. 1003 ¶¶ 64, 65).¹⁵

In sum, on this record, Hummel requires the need for “picking, choosing, and combining” to arrive at the “migrating compound” in the specific arrangement specified in claim 1. *In re Arkley*, 455 F.2d at 587. Petitioner does not show that the number of choices are so “limited” that an ordinarily skilled artisan would “at once envisage the claimed arrangement or combination.” *UCB, Inc.*, 65 F.4th at 688 (internal quotations omitted);

¹⁵ Dr. MacLean’s extrinsic opinions about why an ordinarily skilled artisan would have selected a migrating compound from the list of Hummel’s optional additives, specifically for inclusion in layer (e) of Hummel’s multilayer film, also relies heavily on disclosures from the ’882 patent. Ex. 1003 ¶¶ 129–132. Dr. MacLean’s opinions are ineffective to backfill Hummel’s lack of a teaching directed to the use of any particular additive in any particular layer of Hummel’s five-layer film. *Id.* ¶¶ 64, 65, 126–134.

see Resp. 40, 42 (Patent Owner’s argument that Hummel’s “laundry list” of optional additives presents the need for “a selection of one out of 140” possible alternatives).

For the above reasons, we determine that Petitioner fails to establish that Hummel anticipates claim 1.

b) Dependent Claims

Claims 4–7, 10, and 11 each depend, directly or indirectly, from claim 1. For these dependent claims Petitioner relies on the assertions made against independent claim 1 based on anticipation by Hummel. Pet. 30–36.

As discussed above, Petitioner has not sufficiently shown that Hummel anticipates the subject matter of claim 1. That deficiency is not cured by the addition of new arguments presented by Petitioner to account for the further features of dependent claims 4–7, 10, and 11. *Id.*

Accordingly, we determine that Petitioner has not established that Hummel anticipates claims 4–7, 10, or 11.

c) Ground 1 Conclusion

For the above reasons, Petitioner has not shown by a preponderance of the evidence that claims 1, 4–7, 10, and 11 are anticipated by Hummel.

5. *Alleged Obviousness of Claim 3 over Hummel (Ground 2)*

Ground 2 challenges solely claim 3 and is based on arguments that the additional feature of claim 3 (relative to claim 1) would have been obvious over Hummel. Pet. 36. Claim 3 depends directly from claim 1 and, to make out this challenge, Petitioner relies on the adequacy of the anticipation arguments advanced against claim 1 in Ground 1. *Id.*

Our analysis above, regarding the deficiency in Petitioner’s challenge as to claim 1, applies with equal force to claim 3. The deficiency is not cured

by Petitioner’s inclusion of “the general knowledge of” an ordinarily skilled artisan to account for the further features of dependent claim 3. *Id.* at 37.

Accordingly, on this record, Petitioner has not established that the subject matter of claim 3 would have been obvious over Hummel.

6. *Alleged Obviousness over Hummel and Schuhmann (Ground 3)*

Petitioner argues that the subject matter of claims 1, 3–7, and 10–13 would have been obvious over the disclosures of Hummel and Schuhmann. Pet. 24 (grounds chart). Petitioner identifies with particularity disclosures in the prior art that teach or suggest each feature of the claimed invention. *Id.* at 39–53. Petitioner also provides well-supported reasons why an ordinarily skilled artisan would have combined the features of the prior art in the manner claimed with a reasonable expectation of success. *Id.* at 40, 43, 44.

For example, when addressing the coating limitation, Petitioner submits that the combination of Hummel and Schuhmann would have suggested a “coating with a migrating compound” that is “applied over” the article specified in claim 1. We agree with Petitioner that Schuhmann teaches “release films” that include—“on one side” and applied “as a finish”—“a coating or covering based on at least one lipophilic compound.” *Id.* at 42 (quoting Ex. 1007, 5:6–13; Ex. 1003 ¶¶ 180–182) (Petitioner’s emphasis omitted). This describes the “second scenario” discussed in our claim construction analysis, in which a migrating compound is *deposited over* a surface (as opposed to *migrating to* a surface as in the “third scenario”).

Petitioner persuasively shows that Schuhmann discloses a release film “coated on one side with the lipophilic compound,” or having “occupancy on at least one of its surfaces by at least one migrated lipophilic compound.”

Id. at 42–43. Schuhmann makes plain that “[a] wax is preferably present as the lipophilic compound for achieving the required release effect of the release film.” *Id.* at 43 (alteration in original); Ex. 1007, 6:10–11; Ex. 1003 ¶¶ 183–184. Schuhmann describes this painted-on-type release film in one embodiment as “an external coating based on at least one lipophilic compound as a *finish*.” Pet. 43 (quoting Ex. 1007, 6:1–2).

Schuhmann provides “examples of suitable waxes including ‘fatty acids,’ ‘fatty acid amides,’ and ‘surfactants.’” *Id.* (quoting Ex. 1007, 6:12–22. Significantly, Schuhmann expressly states that “[a] particularly preferred fatty acid amide is ethylene-bis-stearylamine” (Ex. 1007, 8:28–30)—that is, the same EBS wax employed as the migrating compound in the ’882 patent (Ex. 1001, 16:6). There is no dispute on this record that EBS wax represents a “migrating compound” within the scope of claim 1. Pet. 43 (quoting Ex. 1007, 8:28–30 and citing Ex. 1037 ¶¶ 15, 28, 40) (alteration in original).

To be clear, Schuhmann teaches the use of “Constab® PE-SA 270 as the release agent—the same ‘migrating compound’ cited in the” challenged patent. Reply 4; Ex. 1007, 23; Ex. 1001, 15:15–18, 16:3–65.

In a nutshell, Petitioner establishes that every element of claim 1 is disclosed by Hummel, except for the coating limitation, and that Schuhmann expressly discloses that coating limitation. Pet. 39–53. Petitioner further directs us to persuasive reasons why an ordinarily skilled artisan would have combined Hummel and Schuhmann in the arrangement claimed, namely, by applying Schuhmann’s coating over the surface of Hummel’s layer (e), which faces the cured resin. *Id.* at 43–45. Doing so meets the second scenario discussed in our claim construction analysis, by which a “coating with at least one migrating compound” is “applied over” the surface specified in claim 1. Ex. 1001, 20:32–34.

On that point, the references provide, within their own four corners, the suggestion that would have led to the particular arrangement of claim 1. Schuhmann describes release films coated “on at least one side to achieve their release effect” (Ex. 1007, 4), directly suggesting the usefulness of Schuhmann’s release films “to provide a good release effect between” Hummel’s layer (e) and its cured resin. Pet. 44; Ex. 1003 ¶ 194; Ex. 1005, 23:1–3 (Hummel, explaining the desirability of providing a film that releases from the cured resin “without tearing or seizing”).

When these two references are read together, Schuhmann provides a known, predictable solution (a release film “coated on at least one side” with EBS wax, the same compound used in the challenged patent) for achieving a result expressly described as desirable in Hummel, namely, removal of its inner tubular layer, “after the resin has cured,” without “tearing or seizing” during the process of removal.¹⁶ Ex. 1005, 7, 23.

Patent Owner does not dispute Petitioner’s arguments and evidence, except to contest four points. First, Patent Owner argues, Hummel and Schuhmann are not combinable because the references are in non-analogous arts. Resp. 45. Second, Patent Owner submits that Petitioner’s rationale for the proposed combination is inadequate because “Hummel does not disclose any need or desire to improve the release effect between the inner tubular film and the [ultra-violet]-curable resin” and, thus, fails to recognize the tearing problem allegedly addressed by the claimed invention. *Id.* Third, Patent Owner states that Petitioner’s rationale for the proposed combination

¹⁶ As explained in the next section, even if we accept Patent Owner’s view that Hummel’s film displayed no tearing because Hummel solved the tearing problem by means other than those disclosed in Schuhmann (Resp. 45), that does not obscure the plain fact that Hummel recognizes tearing as a problem.

is inadequate for failure to take account of Schuhmann’s disclosure that its release film must “be embossed” in a manner that allegedly would have been incompatible with Hummel’s multilayer film. *Id.* at 46. Fourth and finally, Patent Owner submits that, even if Hummel and Schuhmann would have been combined, “the combined teachings do not disclose or suggest the unexpectedly improved properties achieved by the claimed film.” *Id.* at 50.

We address each of those arguments in turn below.

a) Claim 1

(1) Analogous Art

Patent Owner argues that “Hummel and Schuhmann are concerned with entirely different types of systems and polymeric films.” Resp. 45. In that regard, Patent Owner argues that “[t]he interface of Hummel’s inner tubular film and [ultra-violet]-curable resin involves adhesive forces, if any, that may exist between the [ultra-violet]-curable and cured resins and the polyamide material used as the external layer.” *Id.* Patent Owner contrasts that circumstance with Schuhmann’s adhesive material and release films, which allegedly involve different forces than Hummel. *Id.* Patent Owner states that an ordinarily skilled artisan “would not have seen any rational basis to use Schuhmann’s release film in Hummel and have a reasonable expectation of success.” *Id.*

These are attorney arguments, unsupported by evidence, except for a single citation to Schuhmann’s “sticky” products. *Id.* (citing Ex. 1007, 17). Because that sole citation to evidence is inadequate to support Patent Owner’s arguments about the understanding of an ordinarily skilled artisan, we agree with Petitioner that these conclusory arguments are “baselessly” advanced by Patent Owner. Reply 3.

The relevant inquiry is whether a reference “is reasonably pertinent to the particular problem with which the inventor is involved.” *In re Clay*, 966 F.2d 656, 659 (Fed. Cir. 1992). Schuhmann’s release films are “reasonably pertinent” to a problem addressed in the ’882 patent, namely, providing a “release effect against adhesive substances such as resins.” Ex. 1001, 2:56–57. So too is Hummel, which relates to removal of an inner tubular layer, “after the resin has cured,” without “tearing or seizing” during the process of removal. Ex. 1005, 7, 23. On this record, an ordinarily skilled artisan would have been aware of both references and would have taken account of their combined disclosures.

(2) *Recognition of Tearing as a Problem*

Patent Owner argues that “Hummel does not disclose any need or desire to improve the release effect between the inner tubular film and the [ultra-violet]-curable resin.” Resp. 45. “In fact,” Patent Owner submits, “Hummel explicitly states that Hummel’s film can be withdrawn without tearing.” *Id.* at 28. Thus, in Patent Owner’s view, an ordinarily skilled artisan would have formed no desire to add Schuhmann’s release coating to the outer surface of Hummel’s inner tubular layer (which was otherwise known to undesirably adhere to the cured resin) because Hummel had already solved the tearing problem and, furthermore, including an unnecessary extra coating or covering would take time, be expensive, and introduce potentially adverse effects. *Id.* at 28–29.

We first address Patent Owner’s view that “Hummel’s film did not have a release effect problem.” Sur-reply 8. Even if we accept that Hummel’s film displayed no tearing because Hummel solved that problem by means other than those disclosed in Schuhmann (Resp. 45), that

circumstance does not negate the plain fact that Hummel recognizes that tearing was a problem known in the art of trenchless sewer pipe repair, precisely because, as discussed in the '882 patent, it would have been understood that when removing an inner film from the surface of a cured resin, “[i]n the worst case scenario, a poor release effect of the inner tube film when pulled out of the cured tubular liner causes the inner tube film to tear off owing to excessive adhesion to the resin,” leaving behind undesirable “film fragments.” Ex. 1001, 2:34–40; *see* Ex. 1005, 22–23 (Hummel, identifying in similar terms the desirability of using an inner tubular film that is not amenable to “being pulled in or torn off” during insertion and, further, “can be peeled off as an inner tube, preferably without tearing or seizing” after curing of the resin).

Hummel, like the '882 patent, discusses the desirability of providing an inner tube that, “after the resin has cured, can be peeled off from it without being torn.” Ex. 1005, 7. And Schuhmann, quite similarly, is directed specifically to “[r]elease films that are siliconized on at least one side to achieve,” or contain “waxy additives” that achieve, a desirable “release effect” without “sticking.” Ex. 1007, 4.

Patent Owner’s argument that Hummel solves the tearing problem by some means other than the solution disclosed by Schuhmann is ineffective to undercut Petitioner’s rationale for the proposed modification. Where there is a need “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.” *KSR*, 550 U.S. at 421.

Furthermore, even where “a second reference is cited to solve a problem that is already solved” by a first reference, that circumstance does not defeat a showing of obviousness because “[w]e start from the self-

evident proposition that mankind, in particular, inventors, strive to improve that which already exists.” *In re Seidling*, 2020 WL 8186223, *4 (PTAB Dec. 17, 2020) (quoting *Pro-Mold & Tool Co., Inc. v. Great Lakes Plastics, Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996)).

An ordinarily skilled artisan would have been aware both of Hummel’s suggestion to add “waxes” to the layers of its multilayer film, and Schuhmann’s suggestion that “waxy additives” improve the release effect of a sticky material. Ex. 1005, 7; Ex. 1007, 4. That artisan would have been informed by Schuhmann’s express disclosure of the desirability of using a release film that is “coated on one side with a lipophilic compound,” such as EBS wax (Ex. 1007, 4–5, 23), in which the release film has “occupancy on at least one side of its surfaces at least one migrated lipophilic compound,” preferably a “wax.” Pet. 18 (quoting Ex. 1007, 4:9–12, 5:6–15) (Petitioner’s emphasis omitted).

Petitioner persuasively shows that the applied prior art would have led an ordinarily skilled artisan to modify Hummel’s multilayer film and, in particular, layer (e), to include Schuhmann’s wax-based release film in order “to provide a good release effect between the inner tubular film and the cured carrier material.” Pet. 43; *see id.* at 42, 44 (additional persuasive evidence); Ex. 1003 ¶ 194; Ex. 1005, 22–23 (bridging paragraph); Ex. 1007, 4–5. Stated somewhat differently, Schuhmann’s disclosure of wax-based release coatings fills the gap in Hummel’s own instruction that “waxes” are a suitable optional additive to layer (e) of its multilayer film. Ex. 1005, 11.

(3) Schuhmann’s “Embossed” Release Film

Patent Owner argues that Schuhmann requires an “embossed” release coating because, when compared to a non-embossed example, Schuhmann’s

embossed film confers a lower separation force. Resp. 46. As an initial matter, we are not persuaded that Schuhmann's disclosure of two alternatives (namely, a preferred embossed release coating and less preferred non-embossed release coating) limits Schuhmann's disclosure, as Patent Owner argues, to only an embossed release film. *Id.*

By focusing exclusively on Schuhmann's preferred embossed embodiment, Patent Owner fails to account adequately for what the combined disclosures of the references fairly would have suggested to an ordinarily skilled artisan. On this record, we find that the combined disclosures of the prior art would have suggested the use of either of the embodiments (embossed or non-embossed) discussed in Schuhmann.

On that point, we do not agree that an ordinarily skilled artisan would have been dissuaded from modifying Hummel's layer (e) to include, on the side adjacent to the cured resin, Schuhmann's embossed release film. We find unpersuasive Patent Owner's view that one would have avoided that modification because doing so would "make the removal of Hummel's inner tubular film more difficult" due to a phenomenon known "as 'mechanical locking.'" *Id.* at 47 (citing Ex. 2001 ¶ 53).

In that regard, Patent Owner argues that even if the ordinarily skilled artisan would have attempted to apply Schuhmann's embossed coating over the appropriate surface of Hummel's layer (e)—that is, the surface adjacent to "a flowable curable resin such as one commonly used in trenchless sewage pipe renovation systems"—such an arrangement "could actually increase the adhesion between the surface, perhaps resulting in" a negative phenomenon known "as 'mechanical locking.'" *Id.* On that basis, Patent Owner submits, the artisan "would have reasonably expected" Petitioner's

proposed “modification to make the removal of Hummel’s inner tubular film more difficult.” *Id.*

Patent Owner continues, “Schuhmann is not concerned with resin seeping into the valleys of the embossed film because Schuhmann’s adhesive is solidified and would not flow, thereby achieving reduced contact. But that would not happen in a [ultra-violet]-curable system” such as Hummel’s. *Id.* at 49. We find that Patent Owner argues the references separately, instead of accounting for what their combined disclosures fairly would have suggested to a person exercising ordinary skill in the art: Even though Schuhmann does not refer to films useful for cured-resin pipe repair, Hummel does expressly, and the ordinarily skilled artisan would have accounted for any known “mechanical locking” disadvantage that embossing of the release film would have presented. *Id.* at 47, 49. A person of ordinary skill is also a person of ordinary creativity, not an automaton, and we do not abandon our common sense when considering the issue of obviousness. *KSR*, 550 U.S. at 421.

Along a similar line, Patent Owner argues, “Schuhmann teaches an embossed film for covering materials with a ‘tacky’ surface.” Resp. 58. In Patent Owner’s view, “Hummel features a multilayer film in contact with a curable plastic resin,” which would have “physical properties notably different compared to the tacky products disclosed in Schuhmann.” *Id.* at 58–59. Patent Owner contends that “an embossed structure would decrease contact surface area with the tacky products in Schuhmann,” whereas “the flowable plastic resin in Hummel would fill between embossed elevations while uncured.” *Id.* at 59. Patent Owner argues that an ordinarily skilled artisan “would not have read Schuhmann to teach any benefits with using a lipophilic compound on a non-embossed structure” and would have been

dissuaded from selecting Schuhmann’s embossed release film, which “would have an undesirable effect” in the modified article of Hummel. *Id.*

Petitioner responds that this argument cannot be reconciled with the disclosure of the ’882 patent, which “states that the ‘stickiness’ of pipelining cured ‘sticky resin’ is similar to adhesive tape used in its release tests.” Reply 3 (quoting Ex. 1001, 13:19–21, 17:34–36). Petitioner also points out that “Schuhmann discloses using ‘[EBS] wax’ as the preferred release agent” or, alternatively, “Constab® PE-SA 270 as the release agent—the same ‘migrating compound’ cited in the” challenged patent. *Id.* at 4; Ex. 1001, 15:15–18, 16:3–65; Ex. 1007, 23.

We agree with Petitioner that Patent Owner cannot overcome the evidence of obviousness in this proceeding by attacking the references separately, which plainly is Patent Owner’s aim here. Reply 4. Patent Owner’s arguments do not account adequately, if at all, for the “well-established” principle that a showing “of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements.” *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2010); *see* Resp. 46–50 (Patent Owner’s bodily incorporation arguments).

As Patent Owner acknowledges, moreover, Schuhmann includes a comparative example in which the release film is not embossed, so that option would have been known and available to the ordinarily skilled artisan when contemplating a modification of Hummel in view of Schuhmann, including any known problems ensuing from “mechanical locking.” Resp. 46, 47, 49; Reply 3.

Petitioner persuasively directs us to Hummel’s express disclosure that the inner film may “remain attached to the cured resin or be removed without ‘tearing or seizing,’” thereby “demonstrating a need to improve the

release effect for the removable version.” Reply 4 (quoting and citing Ex. 1005, 7:9–10, 15:7–10, 15:23–24, 23:3); *see* Ex. 1005, 15:10 (Hummel’s express disclosure that its tubular film “preferably” is “pulled off or out as an inner tube from the repaired sewer pipe . . . but can alternatively be left in the repaired pipe”). On this record, “modifying Hummel with Schuhmann’s release agent is nothing more than the use of a known technique to improve a similar device.” Reply 4 (quoting *KSR*, 550 U.S. at 417).

(4) Unexpectedly Improved Properties

Finally, Patent Owner contends that, “[e]ven if Hummel and Schuhmann were combined, the combined teachings do not disclose or suggest the unexpectedly improved properties achieved by the claimed film.” Resp. 50 (citing Ex. 2001 ¶ 56). Notably, on that point, Patent Owner has not shown that any alleged unexpectedly improved properties of the claimed film (such as increased elasticity) are limitations that should be read into the claim.

Patent Owner merely directs us to the testimony of Dr. Brant, who observes that the inventors, as indicated in the ’882 patent specification, found certain embodiments of the invention to have surprisingly improved properties, without explaining how or why this evidence justifies importing into the challenged claims a limitation requiring those asserted properties. Ex. 2001 ¶ 56 (citing Ex. 1001, 2:63–67, 846–53, 19:39–46, 20:5–10).

b) Claims 3–7, 10–13

Petitioner directs us to evidence sufficient to support a conclusion that dependent claims 3–7, 10 and 11 would have been obvious based on the combined disclosures of Hummel and Schuhmann. Pet. 45–53. Patent Owner does not dispute that evidence, except to assert four arguments,

which we dispose of above, in connection with claim 1, from which each of claims 3–7 and 10–13 depends directly or indirectly. Resp. 45–53.

7. *Alleged Obviousness over Hummel and Nagai (Ground 4)*

Petitioner alleges that the subject matter of claims 1, 3–7, 10, and 11 would have been obvious over Hummel and Nagai. The evidence supports that Hummel discloses every limitation of claim 1, but for the coating limitation. Pet. 53–58 (including Petitioner’s detailed mapping of each limitation of claim 1 to disclosures in Hummel).

On that point, Petitioner identifies evidence that an ordinarily skilled artisan would have been aware of “Nagai’s disclosure of coating the inner tubular film of a CIPP^[17] liner with a ‘release agent’ (e.g., silicone, wax),” and would have been led thereby to modify Hummel in view of that disclosure to “create an increased release effect for the inner tubular film of Hummel from cured resins.” Pet. 53; Ex. 1009 ¶ 16.

Importantly, in that regard, Nagai expressly teaches applying a “release agent” between a “thin film” and a “resin absorbent material” for the specific purpose of ensuring “that the thermosetting resin does not function as an adhesive” (Ex. 1009 ¶ 16)—which is directly comparable to Hummel’s statement of the desirability of providing an inner tubular film that may be removed from a cured resin “without tearing or seizing” (Ex. 1005, 23). *See* Pet. 53 (citing Ex. 1003 ¶ 238); *see also* Pet. 55–56 (for more detailed arguments and persuasive citations to evidence).

Nagai employs “silicone” or “wax” as its release agent, explaining that these substances allow for easy removal of a tubular film from a cured resin. Pet. 56 (citing Ex. 1009 ¶¶ 25–27). Further, Nagai indicates “there is

¹⁷ CIPP refers to cured-in-place pipe. Pet. 5.

no tearing of the thin film after construction as before, such as to clog the pipe.” *Id.* (quoting Ex. 1009 ¶ 29). These disclosures support Petitioner’s view that an ordinarily skilled artisan “would have found it obvious to combine Nagai with Hummel as they are both in the field of CIPP technology and both address the need for the easy release of” an “inner tubular film from” a “cured resin with ‘no tearing.’” *Id.* (quoting Ex. 1009 ¶ 16); Ex. 1003 ¶ 235.

As for the coating limitation of claim 1, Petitioner directs us to persuasive evidence that Nagai applies its release agent “over the external side of” an “inner tubular film to form a release coating between the inner tubular film and the resin to be cured.” Pet. 57; Ex. 1009 ¶ 16. Petitioner also directs us to evidence, which we find persuasive in view of the express disclosures in Hummel and Nagai, that an ordinarily skilled artisan would have been prompted to apply Nagai’s release agent “over a section of or an entire circumferential area of the outer facing external side” of Hummel’s layer (e) “‘facing the carrier material’ as recited in claim 1.” Pet. 57; Ex. 1003 ¶¶ 233–238, 241.

Petitioner’s showing here goes to the second scenario (not the third scenario) as discussed in our claim construction analysis: Under that second scenario, a coating with a migrating compound is applied over the external surface of an inner film, whereas under the third scenario, *not* implicated here, a migrating compound added to the inner film materials migrates (over some time span and to some unspecified degree) to the surface of the film to form (via migration) a coating or covering. Pet. 55–59.

Petitioner similarly directs us to persuasive evidence that the subject matter of dependent claims 3–7, 10, and 11 would have been obvious over the combined disclosures of Nagai and Hummel. Pet. 58–62.

Patent Owner contests Petitioner’s evidence by advancing substantially the same arguments about Hummel that we address above in connection with the ground based on Hummel and Schuhmann; namely, that Hummel’s film does not actually tear, therefore, Petitioner’s reliance on Hummel’s disclosure about the desirability of removing an inner film “without tearing or seizing” (Ex. 1005, 23) is unpersuasive to show obviousness. *See* Resp. 53–54 (for Patent Owner’s arguments on point). We disagree, observing that our analysis, presented above in the context of the ground based on Hummel and Schuhmann, applies with equal force here.

Patent Owner also argues that the proposed modification of Hummel in view of Nagai “could” have led to “catastrophic” consequences during a sewer pipe repair operation, because “[s]ome adhesion is needed between the inner tubular film and the [ultra-violet]-curable resin to facilitate insertion of the tube, proper inflation of the tube to press the curable material against the surface of the pipe and maintain it in that position until cured and to enable curing.” *Id.* at 54–55. Petitioner, however, does not provide sufficient evidence to support that claim on this record. *Id.*

We find significant that none of those obstacles is discussed in the ’882 patent, which employs essentially the same materials as Nagai (“silicone” or “wax”) for essentially the same purpose (as a “release” agent in a coating applied over a film surface that is in contact with a cured resin). *Compare* Ex. 1001, 15:14, 15:41 *with* Ex. 1009 ¶ 16. That circumstance persuasively shows that overcoming the identified obstacles, if necessary, was soundly committed, in the ’882 patent, to an exercise of ordinary skill in the art. *See generally* Ex. 1001 (nowhere addressing those alleged obstacles).

Against that backdrop, we reject Patent Owner’s attempt to hold Hummel and Nagai to a higher standard of disclosure than the ’882 patent.

Resp. 54–55; *see In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994) (“[T]he Board’s observation that appellant did not provide the type of detail in his specification that he now argues is necessary in prior art references supports the Board’s finding that one skilled in the art would have known how to implement the features of the references.”).

Patent Owner also argues that Nagai fails to disclose a covering formed by migration of a compound (such as wax) to the inner surface of a film in contact with a cured resin. Resp. 55. Patent Owner alludes to the third scenario, discussed in our claim construction analysis, but Petitioner does not rely on that third scenario to make out this ground; instead, Petitioner clearly maps disclosures in Nagai to the second scenario, in which a coating with a migrating compound is applied over, or painted onto, the surface of a film in contact with a cured resin. *See* Pet. 55–59.

Patent Owner further argues that claim 11 is directed to the third scenario, in which a covering is formed by compound migration, and on that basis, contends that claim 11 cannot be met by the second scenario, in which a coating with a migrating compound is applied over, or painted onto, an inner surface of a film. Resp. 55–56 (arguing that claim 11 requires a covering formed by compound migration to the surface of a layer and cannot be met by applying a coating “on top of the layer”).

We disagree with Patent Owner. Claim 11 recites “wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer of a homo- or copolyimide.” Ex. 1001, 22:4–7. We read the plain words employed in claim 11 as broad enough to embrace a coating with a migrating compound, where the coating is applied over “an external side” of an insertion tube, for example, the side facing a cured resin. Ex. 1001, 22:4–7 (specifying an

insertion tube in which a migrating compound “is added to an external side”). That reading comports with the disclosures of the ’882 patent specification (Ex. 1001, 10:5–25) and, in our view, Petitioner appropriately maps claim 11 to disclosures in Nagai that relate to that reading of the claim (Pet. 62–63).

8. *Objective Indicia of Nonobviousness*

Patent Owner asserts objective indicia of nonobviousness based on the subjective expectations and impressions of Dr. Boutrid, a named co-inventor of the ’882 patent, which we find insufficient to establish that any results reported in the ’882 patent would have been truly surprising to the hypothetical person of ordinary skill in the art, as informed by the disclosures of the asserted prior art. Resp. 60–64; *In re Soni*, 54 F.3d at 750 (the relevant measure, for assessing unexpected results, is the objective impressions of the hypothetical person of ordinary skill in the art).

It is axiomatic that a showing of unexpected results requires evidence “that the claimed invention exhibits some superior property or advantage that a person of ordinary skill in the relevant art would have found surprising or unexpected.” *In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995). Patent Owner’s reliance on inventors’ impressions is ineffective where no attempt is made to explain how or why those impressions demonstrate that any results obtained would have been truly surprising to a hypothetical person of ordinary skill in the art, informed by the combined disclosures of Hummel and Schuhmann. Resp. 50–52, 60–64.

We give appropriate weight, however, to the opinion testimony of Dr. Brant, upon which Patent Owner also relies. *Id.* at 60–64; Ex. 2001 ¶¶ 66–75. Dr. Brant provides conclusory opinions about the *objective*

understanding of an ordinarily skilled artisan, and inappropriately focuses on the *subjective* impressions of Dr. Boutrid about examples set forth in the '882 patent specification. Reply 15; *see* Ex. 2001 ¶¶ 67, 68, 72, 74 (citing Dr. Boutrid's impressions).

We agree with Petitioner that the relevant inquiry centers on the objective understanding of the hypothetical person of ordinary skill in the art, as informed by the closest prior art. Petitioner argues that the closest prior art is Nagai, which, like the '882 patent, expressly relates to the use of wax and silicone release agents applied over the surface of a tubular film on the side that faces a cured resin material. Reply 9; *compare* Ex. 1001, 15:14, 15:41 *with* Ex. 1009 ¶ 16. Schuhmann similarly teaches the use of a release coating that employs the same EBS wax-based coating from which Patent Owner alleges the surprising results of the invention flow. Ex. 1007, 8.

Significantly, Dr. Brant does not opine about how or why that hypothetical person, informed by the teachings of Nagai or Schuhmann, would have viewed the examples in the '882 patent as revealing truly unexpected results. Ex. 2001 ¶¶ 66–75. Even when we assign some appropriate weight to Dr. Brant's opinion testimony, we determine that the objective evidence of unexpected results does not outweigh Petitioner's relatively strong showing that the claimed invention is unpatentable as obvious in view of Hummel and Schuhmann or Nagai.

9. *Conclusion on Petitioner's Patentability Challenges*

For the above reasons, we determine that Petitioner shows by a preponderance of the evidence that claims 1, 3–7, and 10–13 are unpatentable.

III. MOTIONS TO EXCLUDE EVIDENCE

We next resolve four outstanding motions to exclude evidence.

A. *Patent Owner's Motion to Exclude (Paper 51)*

Patent Owner moves to exclude Exhibits 1047–1049, 1051, 1060, 1061, 1070, and 1071. Paper 51 at 2. According to Patent Owner, “[i]t is not enough for the Board to find that this Motion is moot if the Board does not rely on” these exhibits, because “Petitioner may seek to rely on them to appeal to the Federal Circuit, and Patent Owner could be unfairly forced to face them again.” *Id.*

The Board regularly denies as moot motions to exclude evidence that is not relied upon in a final written decision. *See, e.g., Foursquare Labs, Inc., v. BoardActive Corp.*, IPR2023-00919, Paper 29 at 84 (PTAB Nov. 27, 2024); *Neurocrine Biosciences, Inc., v. Spruce Biosciences, Inc.*, PGR2021-00088, Paper 64 at 12, 20, 21, 23 (PTAB Nov. 26, 2024). Patent Owner does not persuade us that a deviation from this general practice is warranted in this case—the reason given by Patent Owner, involving concerns stemming from appellate review, would apply to all cases.

We do not rely on Exhibit 1047–1049, 1051, 1060, 1061, 1070, or 1071 in this decision, therefore, we deny Patent Owner's Motion to Exclude as moot.

B. *Petitioner's Motion to Exclude Exhibit 2001 (Paper 52)*

Petitioner moves to exclude paragraphs 13–25, 29–40, 42–43, 48–49, 56–61, and 66–75 of Exhibit 2001, which is the declaration of Dr. Brant. Paper 52. In Petitioner's view, Dr. Brant's “declaration is replete with inadmissible hearsay, improper legal conclusions, and testimony unsupported by reliable methods or personal knowledge.” *Id.* at 1.

Petitioner's hearsay objection is not persuasive, where Dr. Brant was made available for cross-examination pursuant to routine discovery in our forum. Petitioner's objections otherwise go primarily to the weight that should be accorded to Dr. Brant's testimony, without raising any persuasive arguments for its exclusion. *See generally id.* (Petitioner's arguments). Accordingly, we deny Petitioner's Motion to Exclude Exhibit 2001.

C. Petitioner's Motion to Exclude Exhibit 2003 (Paper 53)

Petitioner moves to exclude certain paragraphs of Exhibit 2003, which is the declaration of Dr. Schleicher, a named co-inventor of the '882 patent. Paper 53. We do not rely on Dr. Schleicher's declaration in this decision. Accordingly, we deny Petitioner's Motion to Exclude Exhibit 2003 as moot.

D. Petitioner's Motion to Exclude Exhibit 2004 (Paper 54)

Petitioner moves to exclude paragraphs 6–59 of Exhibit 2004, which is the declaration of Dr. Boutrid, another named co-inventor of the '882 patent. Paper 54. In Petitioner's view, Dr. Boutrid's declaration "is riddled with inadmissible evidence, including hearsay, double hearsay, and testimony lacking personal knowledge. Much of the declaration relies on out-of-court statements from unidentified customers and unidentified UV-curable resin manufacturers, none of whom are identified or made available for examination." *Id.* at 1.

Much of the testimony about which Petitioner's objects pertains to customer complaints about Patent Owner's products, and whether maleic anhydride was included in the curable resin used by the customers, which form no part of this decision. *See, e.g., id.* at 4–7. We can take account of Petitioner's objections, including Petitioner's view that parts of Dr. Boutrid's testimony are based on impermissible hearsay and unsound

conclusions, without excluding the evidence, which also serves to preserve the record for appeal. Accordingly, we deny Petitioner's Motion to Exclude Exhibit 2004.

IV. CONCLUSION¹⁸

In summary:

Claims	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 4–7, 10, 11	102(b)	Hummel		1, 4–7, 10, 11
3	103	Hummel		3
1, 3–7, 10–13	103	Hummel, Schuhmann	1, 3–7, 10–13	
1, 3–7, 10, 11	103	Hummel, Nagai	1, 3–7, 10, 11	
Overall Outcome			1, 3–7, 10–13	

¹⁸ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

V. ORDER

It is

ORDERED that Petitioner has shown that claims 1, 3–7, and 10–13 of the '882 patent are unpatentable; and

FURTHER ORDERED that because this decision is final, a party to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IPR2023-01372
Patent 9,657,882 B2

For PETITIONER:

Michael Neustel
Monte Bond
NEUSTEL LAW OFFICES, LTD
michael@neustel.com
monte@neustel.com

Scott McKeown
WOLF, GREENFIELD & SACKS, P.C.
scott.mckeown@wolfgreenfield.com

For PATENT OWNER:

Patrick Doody
PILLSBURY WINTHROP SHAW PITTMAN LLP
patrick.doody@pillsburylaw.com

T. Lester Wallace
Darien Wallace
IMPERIUM PATENT WORKS, LLP
lester@imperiumpw.com
darien@imperiumpw.com