

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

STAHL'S INC.,
Petitioner,

v.

JODI A. SCHWENDIMANN, f/k/a JODI A. DALVEY,
and NUCOAT, INC.,
Patent Owner.

IPR2020-01122
Patent 7,766,475 B2

Before JEFFREY W. ABRAHAM, MICHELLE N. ANKENBRAND, and
AVELYN M. ROSS, *Administrative Patent Judges*.

ANKENBRAND, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)
Denying Petitioner's Motion to Seal
37 C.F.R. § 42.55

I. INTRODUCTION

This is a Final Written Decision in an *inter partes* review challenging the patentability of claims 1–16, 18, and 19 (collectively, “the challenged claims”) of U.S. Patent No. 7,766,475 B2 (“the ’475 patent,” Ex. 1012). We have jurisdiction under 35 U.S.C. § 6. We issue this Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner demonstrates, by a preponderance of the evidence, that claims 1–15 and 18 are unpatentable, and that Petitioner has not demonstrated, by a preponderance of the evidence that claims 16 and 19 are unpatentable.

A. Procedural History

Stahls’ Inc. (“Petitioner”) filed a Petition (Paper 1, “Petition” or “Pet.”) requesting *inter partes* review under 35 U.S.C. § 311. Jodi A. Schwendimann, formerly known as Jodi Dalvey, and NuCoat, Inc. (collectively “Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”). On December 17, 2020, we instituted an *inter partes* review of the challenged claims. Paper 8 (“Institution Decision” or “DI”).

Following institution, Patent Owner filed a Response (Paper 12, “Resp.”), Petitioner filed a Reply (Paper 15, “Reply”), and Patent Owner filed a Sur-reply (Paper 21, “Sur-reply”).

Petitioner relies on the Declaration of Christopher E. Scott, Ph.D. (Ex. 1001), and submitted a supplemental Declaration of Dr. Scott (Ex. 1039) with the Reply. Patent Owner relies on the Declaration of Dr. Christopher Ellison (Ex. 2020). Petitioner took cross-examination testimony of Dr. Ellison via deposition and filed the transcript (Exs. 1040, 1041).

We heard oral argument on September 21, 2021, and the record includes a transcript of the argument. Paper 26 (“Tr.”).

B. Related Proceedings

The parties identify the following litigation involving the ’475 patent: *Jodi A. Schwendimann v. Neenah, Inc.*, Case No. 1:19-cv-00361-LPS (D. Del.) (“Delaware Lawsuit”); *Jodi A. Schwendimann v. Arkwright Advanced Coating, Inc.*, Case No. 0:11-cv-00820-JRT-HB (D. Minn.) (“Arkwright Lawsuit”); *Jodi A. Schwendimann v. Stahls’, Inc.*, Case No. 2:19-cv-10525-LVP-MKM (E.D. Mich.); and *Jodi A. Schwendimann et al. v. Siser North America, Inc.*, Case No. 1:19-cv-00362-LPS (D. Del.). Pet. 3–4; Paper 4, 2–3.

The parties also identify the following proceedings challenging the ’475 patent and related patents: IPR2020-00628, IPR2020-00633, and IPR2020-00641, challenging U.S. Patent No. RE 41,623 (“the RE ’623 patent”); IPR2020-00629 and IPR2020-00635, challenging U.S. Patent No. 7,754,042 (“the ’042 patent”); IPR2020-00634, IPR2020-00644, and IPR2020-00645, challenging U.S. Patent No. 7,749,581 (“the ’581 patent”); IPR2020-00915, challenging the ’475 patent; and IPR2020-00636 and IPR2020-01121, challenging U.S. Patent No. 7,771,554 (“the ’554 patent”). Pet. 4; Paper 4, 2. We instituted review in all of the proceedings except IPR2020-00636, IPR2020-00645, and IPR2020-01121.

On September 10, 2021, we entered final written decisions in IPR2020-00629, IPR2020-00634, IPR2020-00635, and IPR2020-00644 determining all challenged claims of the ’042 patent and the ’581 patent unpatentable. IPR2020-00629, Paper 39; IPR2020-00634, Paper 39; IPR2020-00635, Paper 46; IPR2020-00644, Paper 36. On October 1, 2021,

we entered final written decisions in IPR2020-00628 determining all challenged claims of the RE '623 patent unpatentable, and in IPR2020-00633 and IPR2020-00641 determining some challenged claims of the RE '623 patent unpatentable. IPR2020-00628, Paper 29; IPR2020-00633, Paper 40; IPR2020-00641, Paper 42. On November 1, 2021, we entered a final written decision in IPR2020-00915, determining all challenged claims of the '475 patent unpatentable. IPR2020-00915, Paper 29.

In addition, the parties identify several interference proceedings involving the '475 patent that have concluded—Interference Nos. 105,961, 105,964, and 105,966. Pet. 9–11; Prelim. Resp. 7–9.

C. The '475 Patent (Ex. 1012)

The '475 patent, titled “Image Transfer on a Colored Base,” issued on August 3, 2010. Ex. 1005, [45], [54]. The '475 patent relates to an image transfer sheet comprising a release layer and a polymer layer where one or more of the release and polymer layers comprise titanium oxide or other white pigments. *Id.* at Abstract.

The written description explains that conventional image transfer processes used two-steps: applying a white or light background polymeric material to a colored base with heat and then using another sheet to impart an image to the substantially white polymeric material. *Id.* at 3:37–50. According to the '475 patent, the conventional two-step process required careful alignment of an image with the white background, was “exceedingly time-consuming,” and produced significant waste of base and image transfer materials. *Id.* at 3:51–57. To address that issue, the '475 patent discloses a method that applies the white background, i.e., a “white layer,” and image in a single step. *Id.* at 3:10–21.

The '475 patent describes several embodiments of, and methods for making, an image transfer sheet. One embodiment of the transfer sheet is depicted below in Figure 5.

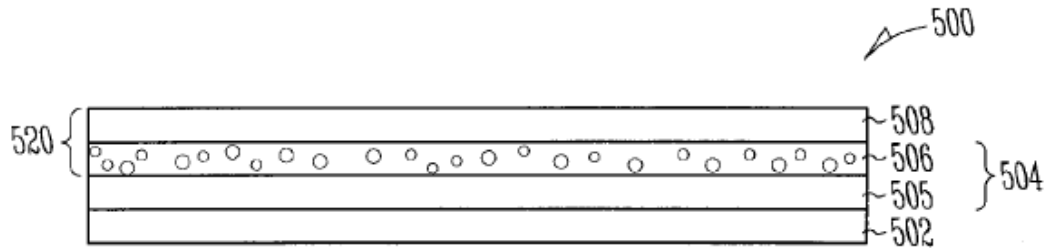


Fig. 5

Figure 5 illustrates “a cross-sectional view of one . . . embodiment of the image transfer device of the present invention.” *Id.* at 2:41–42. “[I]mage transfer sheet 500 . . . is comprised of a substrate layer 502 [and] a release layer 504, comprising a silicone coating 505 and a white layer 506.” *Id.* at 8:45–47. Figure 5 also depicts white layer 506 and receiving layer 508 as part of peel layer 520. *See id.* at 8:53–56, 9:1–3.

The '475 patent describes the white layer as imparting “a white background on a dark substrate.” *Id.* at 3:35–36. According to one embodiment, “the white layer 506 of the image transfer sheet 500 is impregnated with titanium oxide or other white or luminescent pigment.” *Id.* at 8:51–54. In another embodiment, “the white layer 506 and a receiving layer 508, contacting the white layer 506 are impregnated with titanium oxide or other white or luminescent pigment.” *Id.* at 8:54–57.

Referring again to the Figure 5 embodiment, the '475 patent also describes an image transfer process. Specifically, the '475 patent discloses “an image is imparted to the polymer component of the peel layer 520

utilizing a top coat image-imparting material such as ink or toner.” *Id.* at 9:1–3. “[I]mage transfer sheet 500 is applied to the colored base material so that the polymeric component of the peel layer 520 contacts the colored base” and a source of heat is applied to the image transfer sheet 500. *Id.* at 9:11–19. Thus, “[t]he peel layer 520 transfers the image” and “[t]he application of heat to the transfer sheet 500 results in ink or other image-imparting media within the polymeric component of the peel layer being changed in form to particles encapsulated by the polymeric substrate.” *Id.* at 9:19–25. As a result, “[t]he encapsulated ink particles or encapsulated toner particles and encapsulated titanium oxide particles are then transferred to the colored base in a mirror image to the ink image or toner image on the polymeric component of the peel layer 520.” *Id.* at 9:28–32. The ’475 patent further explains:

Because the polymeric component of the peel layer 520 generally has a high melting point, the application of heat, such as from an iron, does not result in melting of this layer or in a significant change in viscosity of the overall peel layer 520. The change in viscosity is confined to the polymeric component that actually contacts the ink or toner or is immediately adjacent to the ink or toner. As a consequence, a mixture of the polymeric component, titanium oxide or other white or luminescent pigment, and ink or toner is transferred to the colored base as an encapsulate whereby the polymeric component encapsulates the ink or toner or titanium oxide or other white pigment. It is believed that the image transfer sheet, with the white titanium oxide or other white or luminescent pigment background is uniquely capable of both cold peel and hot peel with a very good performance for both types of peels.

Id. at 9:33–48.

D. Illustrative Claims

Petitioner challenges claims 1–16, 18, and 19 of the '475 patent. Of the challenged claims, claims 1, 13, and 19 are independent. Claims 1 and 19 are illustrative and are reproduced below.

1. An ink-jet transfer article, comprising:
 - a substrate member including a substrate surface;
 - an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and
 - a second layer overlaying the opaque first layer and configured to receive indicia, the second layer including polyurethane and a polymeric material.

Ex. 1012, 11:34–41.

19. A method of transferring an image to a dark-colored or black receiving member, comprising:
 - providing an ink-jet transfer article, comprising
 - a substrate member including a substrate surface;
 - an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and
 - a second layer overlaying the opaque first layer and configured to receive indicia printed using an ink-jet printer, the second layer including polyurethane and a polymeric material;
 - wherein the substrate member is peeled away from the opaque first layer and the second layer;
 - wherein the opaque first layer and the second layer are applied to the dark-colored or black receiving member such that received indicia face upwards;

wherein the substrate layer, when peeled, or an overlay release paper is positioned over the second layer and the opaque first layer; and

wherein heat is applied to one of the substrate layer or the overlay release paper, the second layer, and the opaque first layer so that received indicia and a substantially white background for received indicia, provided by the opaque first layer, are transferred to the colored or black receiving member at substantially the same time.

Id. at 12:42–67.

E. Asserted Unpatentability Challenges

We instituted an *inter partes* review of the challenged claims on the following grounds of unpatentability:

Claims Challenged	35 U.S.C. §¹	References/Basis
1–3, 5–15, 18	103	Akada, ² Takao ³
4	103	Akada, Takao, Kronzer ⁴
15	103	Akada, Takao, Kronzer
19	103	Akada, Takao, Hare ⁵
19	103	Akada, Takao, Oez ⁶
13–15, 18	102	Asajima ⁷
15	103	Asajima, Kronzer
16	103	Asajima, Kronzer
13, 18	103	Oez, Takao

¹ Because the claims at issue have an effective filing date before March 16, 2013, the effective date of the applicable provisions of the Leahy Smith America Invents Act, Pub. L. No. 112–29, 125 Stat. 284 (2011) (“AIA”), we apply the pre-AIA version of 35 U.S.C. § 103 in this decision.

² US 5,451,560, issued Sept. 19, 1995 (Ex. 1027).

³ US 5,753,589, issued May 19, 1998 (Ex. 1019).

⁴ US 5,242,739, issued Sept. 7, 1993 (Ex. 1028).

⁵ US 5,948,586, issued Sept. 7, 1999 (Ex. 1021).

⁶ US 5,665,476, issued Sept. 9, 1997 (Ex. 1020).

⁷ US 5,418,207, issued May 23, 1995 (Ex. 1018).

II. ANALYSIS

A. *Legal Standards*

To prevail in its challenge, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d) (2019). A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time of the invention to a person having ordinary skill in the art. *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations.⁸ See *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Subsumed within the *Graham* factors is the requirement that the skilled artisan would have had a reasonable expectation of success in combining the prior art references to achieve the claimed invention. *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). “Obviousness does not require absolute predictability of success. . . . [A]ll that is required is a reasonable expectation of success.” *In re O’Farrell*, 853 F.2d 894, 903–04 (Fed. Cir. 1988).

Moreover, “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield

⁸ The record does not contain evidence or argument regarding objective evidence of nonobviousness.

predictable results.” *KSR*, 550 U.S. at 416. “If a person of ordinary skill can implement a predictable variation, § 103 likely bars its patentability.” *Id.* at 417.

B. Level of Ordinary Skill in the Art

In the Decision on Institution, we determined that a person of ordinary skill in the art at the time of the invention of the ’475 patent would have had “a Bachelor’s degree in Chemistry, Chemical Engineering, Imaging Technology or Material Science with at least one year of experience in coating technologies and imaging technologies, or at least five years of work experience in the field of coating technologies and imaging technologies.” DI 8 (adopting Dr. Ellison’s description of the level of ordinary skill in the art). For purposes of this Final Written Decision, we maintain our determination from the Institution Decision because neither party disputes that determination and that level of ordinary skill is consistent with the record. *See* Resp. 20–21; *see generally* Reply.

C. Claim Construction

In an *inter partes* review, we construe claims “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.” 37 C.F.R. § 42.100(b). Furthermore, we expressly construe the claims only to the extent necessary to determine whether to institute *inter partes* review. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803

(Fed. Cir. 1999))). For purposes of this decision, the claim term “white layer,” and the order of method steps in claim 19 merit discussion.

1. White layer⁹

In the Institution Decision, we determined that each of the claims in the ’475 patent requires a “white layer” that melts and mixes with another layer or layers during application. DI 9–11. Our construction was based on the parties’ agreement that the claims of the ’475 patent require a white layer that melts and mixes with another layer, and on the claim construction of “white layer” that the district court in the Arkwright Lawsuit adopted. Ex. 1038, 17 (Arkwright Lawsuit Markman Order). The district court in the Delaware Litigation also adopted a similar construction of “white layer.” Ex. 1045, 8 (Delaware Markman Order). In the Institution Decision, we rejected Patent Owner’s attempt to modify the interpretation adopted in the Arkwright Lawsuit to include “a polymer that softens or melts and mixes to some degree with another layer.” DI 10–11 (Patent Owner’s modifications underlined).

In its Response, Patent Owner again requests that we adopt a construction of “white layer” that differs from the construction adopted in the Arkwright Lawsuit and in our Institution Decision. Specifically, Patent Owner’s proposed construction includes “a layer comprising a concentration or configuration of pigment providing a white background for received indicia and which further comprises a polymer that softens or melts, such

⁹ Although the term “white layer” is not expressly recited in claim 1 of the ’475 patent, both parties agree that all claims of the ’475 patent require a white layer that melts and mixes. *See, e.g.*, Pet. 11–12; Resp. 11–14, 19. We also note that Petitioner and Patent Owner treat “white layer” and “opaque background” synonymously. Pet. 9–11; Resp. 21–23.

that it mixes with another layer or layers during application, without the resulting composition needing to be substantially uniform.” Resp. 21–23 (Patent Owner’s modifications underlined).

In its Reply, Petitioner notes that after our Institution Decision, the district court in the Delaware Lawsuit issued the following construction of “white layer,” “to which Patent Owner has conceded”: “A layer comprising a concentration or configuration of pigment providing a white background for receiving indicia and which further comprises a polymer that melts and mixes with another layer or layers during application.” Reply 1 (citing Ex. 1045, 8 and referring generally to the oral argument in IPR2020-00633). Petitioner also directs us to the Delaware court’s conclusions that “[w]ith respect to ‘melt,’ . . . all claims of the Dark Transfer Patents require actual melting . . . , which a person of ordinary skill in the art [] would understand to mean *not* just ‘softening,’” and that “the plain and ordinary meaning of ‘mix’ clearly does not require that the resulting mixture be substantially uniform.” *Id.* at 2 (citing Ex. 1045, 9–11). Petitioner contends that we should adopt the Delaware court’s construction of “white layer.” *Id.*

We decline to adopt Patent Owner’s proposed construction, which departs from the constructions in the Arkwright Lawsuit and the Delaware Lawsuit, which both require actual melting, not just softening, and construe “mix” to have its plain and ordinary meaning. Ex. 1038, 17; Ex. 1045, 8–11. Accordingly, we maintain our construction of the term “white layer” from the Institution Decision.

Further, to the extent Patent Owner argues that our construction of “white layer” requires an actual transfer of an image onto a substrate (for example, after printing, using heat), we disagree. *See, e.g.*, Reply 5;

Tr. 32:15–33:19, 46:15–49:25. Although we construe the term “white layer” as comprising a polymer that melts and mixes “during application,” this merely reflects a property of the polymer that occurs, for example, once heat is applied to an image transfer sheet. It does not mean that transferring an image from a sheet to a substrate *must* occur to satisfy claims 1 and 13. We discuss this in more detail below with respect to our construction of the preamble of claims 1 and 13, and in our prior art analysis of these claims. We note, however, that Patent Owner states that “the parties’ disputes with respect to the construction of the ‘white layer’ make no difference to the Board’s resolution of this matter.” Resp. 23.

2. Order of steps

Claim 19 of the ’475 patent recites a method that includes several steps. Ex. 1012, 12:42–67. In its Response, Patent Owner argues that the order of the method steps, i.e., “providing an ink-jet transfer article,” “wherein the substrate member is peeled away,” “wherein the opaque first layer and the second layer are applied to the dark-colored or black receiving member,” and “wherein heat is applied” is sequential. Resp. 23–24. Patent Owner explains that “[t]his is because the Claim requires ‘that received indicia face upwards,’” and “[i]f one were to place the transfer so that received indicia faces upwards, but not remove the backing paper before applying heat, then the backing paper (sandwiched between the fabric and the transfer) would prevent the transfer from adhering to the fabric.” *Id.* In its Reply, “Petitioner does not dispute Patent Owner’s position that the step of ‘peeling’ the substrate is performed before the step of applying the opaque layer and second layer to the receiving member and the steps recited thereafter.” Reply 2.

Both parties agree that the steps of method claim 19 must be performed in sequential order. Thus, we need not construe this aspect of the claim language because it is not in controversy. *Nidec*, 868 F.3d at 1017.

D. Alleged Obviousness over Akada and Takao (claims 1–3, 5–15, 18)

Petitioner contends that the subject matter of claims 1–3, 5–15, and 18 would have been obvious over Akada in view of Takao. Pet. 29–30. Petitioner directs us to portions of Akada and Takao that purportedly disclose each of the limitations in the challenged claims. *Id.* at 30–52. Petitioner also relies on Dr. Scott’s testimony to support its arguments. *See id.* We provide a brief summary of Akada and Takao before turning to the parties’ arguments and our analysis.

1. Akada (Ex. 1027)

Akada relates to a system “adapted for the formation of images on any selected objective body, such as cards, clothes, papers, and transparent sheets.” Ex. 1027, 1:15–17. Akada describes image transfer sheet 310 consisting of “a sheet-like substrate 301 [that] is provided at its one surface with an image-reception layer 302 capable of peel-off from the substrate.” *Id.* at 16:10–14. A series of Akada’s different image transfer sheet embodiments are depicted in Figures 13–17, which we reproduce below.

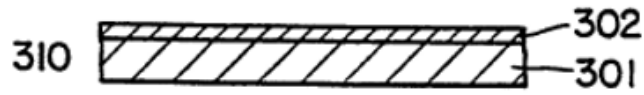


FIG. 13

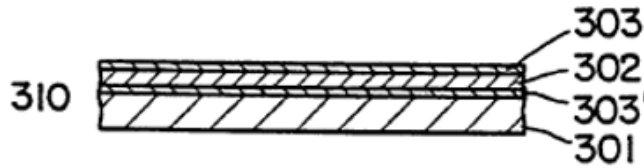


FIG. 14

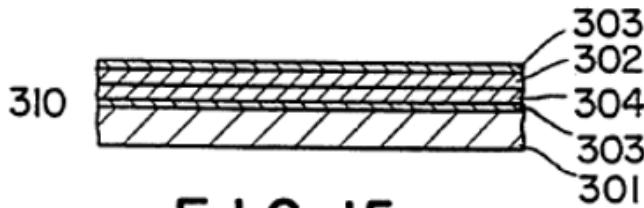


FIG. 15

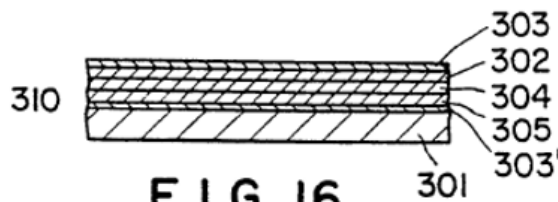


FIG. 16

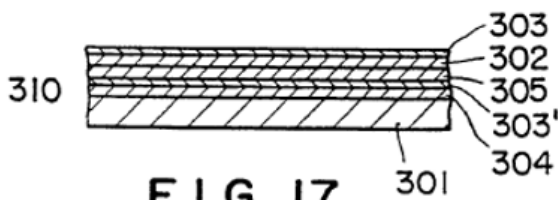


FIG. 17

Figures 13–17 “are a series of sectional views, respectively illustrating several structural examples of image-transferable sheets, suitable for use in the invention.” *Id.* at 4:44–47. Figures 13–17 depict image transfer sheet 310 comprised of sheet-like substrate 301 and image-reception

layer 302, as well as optionally including parting agent layer 303, intermediate layer 304, and protecting layer 305. *See id.* at 16:5–18:9.

Akada discloses that “a white pigment is preferably admixed with the material of the image-reception layer for improving the whiteness thereof and further accentuating the sharpness and fineness of the images when transferred thereto and to provide a manually writing-on performance.” *Id.* at 22:39–44.

2. *Takao (Ex. 1019)*

Takao “relates to a thermal transfer image-receiving sheet for use in a thermal dye transfer system and more particularly to a thermal transfer image-receiving sheet having improved whiteness in its image-receptive surface by virtue of provision of a specific whiteness-improving layer.” Ex. 1019, 1:6–10. Takao describes “a thermal transfer image-receiving sheet comprising a substrate sheet, a whiteness-improving layer, and a receptive layer provided on top of one another in that order, the whiteness-improving layer comprising a water-soluble polymer containing a water-soluble fluorescent brightening agent, the receptive layer comprising a resin soluble in an organic solvent.” *Id.* at 1:59–65.

Takao discloses that “[m]aterials for constituting the substrate sheet is not particularly limited, and examples thereof include various types of papers” and films of various types of polymers. *Id.* at 2:15–34.

According to Takao:

The whiteness-improving layer provided on the substrate sheet functions to enhance the whiteness of the image receiving surface of the thermal transfer image-receiving sheet. It may be formed by coating a substrate sheet with a coating solution of a water-soluble polymer and a water-soluble fluorescent

brightening agent dissolved or dispersed in a solvent composed mainly of water and then drying the resultant coating.

Id. at 2:50–57. Takao further explains:

Since the thermal transfer image-receiving sheet of the present invention has a whiteness-improving layer, containing a specific substance, as an independent layer, unlike the conventional thermal transfer image-receiving sheet with additives, such as a fluorescent brightening agent, incorporated into a receptive layer, an improvement in whiteness of the image-receiving surface can be attained without sacrificing the quality and fastness of the image.

Id. at 1:66–2:6.

Takao explains that “[t]he receptive layer provided on the whiteness-improving layer functions to receive a dye being transferred from a thermal transfer sheet and to hold the resultant image thereon.” *Id.* at 6:6–9.

According to Takao, “[t]he formation of the receptive layer using a solution or a dispersion of a water-soluble resin causes the water-soluble fluorescent brightening agent contained in the whiteness-improving layer to migrate into the receptive layer.” *Id.* at 6:12–16.

3. Claims 1 and 13

Petitioner contends that the combination of Akada and Takao discloses the ink-jet transfer article of claims 1 and 13. Pet. 29–37, 44–49. Petitioner argues that the ink-jet transfer article referenced in the preamble is presumptively not limiting on the scope of claim 1. *Id.* at 30 (claim 1), 44 (claim 13). Should we determine that the preamble is limiting, Petitioner argues that Akada discloses an ink-jet transfer article. *Id.* at 30, 45. In particular, Petitioner asserts Akada describes “a system and method for transferring an image ‘on any selected objective body’, including ‘clothes’

and ‘textile fabrics.’” *Id.* at 30 (quoting Ex. 1027, 1:11–18, 32:46–52; citing Ex. 1027, 2:30–37, 16:5–9), 45. Petitioner, relying on Dr. Scott’s testimony, further asserts that although Akada does not specifically mention an ink-jet printer, a person of ordinary skill in the art would have recognized that Akada’s sheets are readily usable with an ink-jet printer. *Id.* at 30 (citing Ex. 1001 ¶¶ 120–121; Ex. 1027, 21:52–22:35), 45 (additionally citing Ex. 1001 ¶¶ 198–199).

Claims 1 and 13 require a substrate member that includes a substrate surface and a removable substrate member, respectively. Ex. 1012, 11:35, 12:15. Petitioner explains that “Akada discloses image-transferable sheets 310 (*e.g.*, image transfer sheets) having a sheet-like substrate 301.” Pet. 31 (citing Ex. 1027, 16:10–14; Ex. 1001 ¶¶ 125–126), 45 (referring back to claim 1 analysis). For claim 13, Petitioner additionally asserts that Akada teaches that the sheet-like substrate is removable because it is “‘capable of peel-off from the substrate. . . .’” *Id.* at 45–46 (quoting Ex. 1027, 17:3–5 (*emphasis omitted*); citing Ex. 1001 ¶ 203).

Claim 1 next requires “an opaque first layer overlaying the substrate surface, the opaque first layer including polyurethane and a white or luminescent pigment; and a second layer overlaying the opaque first layer and configured to receive indicia, the second layer including polyurethane and a polymeric material.” Ex. 1012, 11:36–41. Claim 13 similarly requires an opaque white layer “overlaying a portion of the substrate member” that includes “a binder and a white or luminescent pigment” and “at least one ink-receptive layer overlaying the opaque white layer” that includes “a binder and a polymeric material.” *Id.* at 12:16–21. For the “first layer,” Petitioner alleges that Akada discloses in Figures 15–17 that one or more

layers may be adjacent to a substrate surface of sheet-like substrate 301. Pet. 31 (citing Ex. 1027, Figs. 15–17). According to Petitioner, Akada’s intermediate layer 304 and/or protecting layer 305 that overlays sheet-like substrate 301 satisfy the “first layer” limitation. *Id.* at 32.

For the second layer, Petitioner contends that Akada discloses image-reception layer 302 that overlays one or more of intermediate layer 304 and protecting layer 305. *Id.* at 33 (citing Ex. 1001 ¶¶ 127–133; Ex. 1027, Figs. 15–17). Petitioner asserts that image-receptive layer 302 may be formed from “polyurethane resin” and other “polymeric materials,” and “must be suitable for reception of heat transfer dyestuff . . . and maintaining the thus formed images thereon.” *Id.* (citing Ex. 1027, 21:48–22:38); *see id.* at 46, 48–49 (making similar argument as to claim 13’s “ink-receptive layer” that includes “a binder and polymeric material”).

Turning to the “white or luminescent pigment” (claim 1) and “opaque white layer” (claim 13) limitations, Petitioner contends that Akada teaches that “white pigment is preferably admixed with the material of the image-reception layer for improving the whiteness thereof and further accentuating the sharpness and fineness of the images when transferred thereto and to provide a manually writing-on performance.” *Id.* at 33, 46 (both citing Ex. 1027, 22:39–44). Petitioner asserts that although Akada “does not specifically disclose incorporating white pigment in a layer separate and distinct from the image-reception layer,” Takao teaches “a thermal transfer image-receiving sheet for use in a thermal dye transfer system” that includes “a substrate sheet, a whiteness-improving layer, and a receptive layer provided on top of one another in that order.” *Id.* at 33–34, 46–47 (both citing Ex. 1019, 1:6–8, 1:59–62). According to Petitioner, Takao provides

that “titanium oxide can be added to the whiteness-improving layer for the purpose of hiding glaring and irregularities of the substrate sheet.” *Id.* at 34, 48 (both quoting Ex. 1019, 5:26–28).

Petitioner argues that a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takao to incorporate Akada’s white pigment into intermediate layer 304 and/or protecting layer 305, or to add an additional distinct whiteness-improving layer to provide a whiteness-improving layer that provides better contrast for the printed image. *Id.* at 34 (citing Ex. 1001 ¶¶ 132–135), 47 (citing Ex. 1001 ¶¶ 212–213). Petitioner further contends that an ordinarily skilled artisan would have reasonably expected to improve upon the beneficial results that Akada achieves from incorporating white pigment into the image-reception layer by incorporating white pigment into a separate layer as Takao teaches. *Id.* at 35, 48.

Petitioner additionally asserts that “Akada as modified by Takao teaches adjacent layers of polyurethane and polyurethane; adjacent layers of polyamide and polyurethane; adjacent layers of polyurethane and ethylene vinyl acetate (EVA), and adjacent layers of polyolefin and polyurethane, where one of the layers is pigmented.” *Id.* at 36. Petitioner argues that these layers “correspond[] to, for example, the ’475 Patent’s disclosure of polyamide, polyurethane, and ethylene vinyl acetate in ink receiving layer 306; and/or urethane in release coating 304; and/or nylon (nylon is another term for polyamide), ethylene vinyl acetate, and polyolefin in image imparting layer 406.” *Id.* (citing Ex. 1001 ¶¶ 137–46). Petitioner argues that the adjacent layers described in Akada as modified with Takao will

exhibit the same behavior (i.e., melt and mix) as the layers in the '475 patent. *Id.* at 37 (citing Ex. 1001 ¶ 149).

Patent Owner contends that: (1) Petitioner fails to show that Akada or Takao discloses an “ink-jet transfer article,” as recited in claims 1 and 13, (2) Takao is not analogous art, (3) Petitioner fails to establish that the combination of Akada and Takao discloses or suggests an “opaque . . . layer” that melts and mixes, (4) Akada teaches away from adding pigment to its protective layer or intermediate layer, (4) Petitioner fails to show that a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takada, and (5) Petitioner fails to show that an ordinarily skilled artisan would have had a reasonable expectation of success in arriving at the claimed subject matter. Patent Owner also contends, as to claim 13, that neither Akada nor Takao teaches “at least one ink-receptive layer.” *Id.* at 41. We address Patent Owner’s arguments below.

a) Claim 1 and 13 preambles

In the Institution Decision, we determined that the ink-jet transfer article recited in the preamble of claims 1 and 13 is not limiting. DI 22–24. Recognizing the “general rule [that] preamble language is not treated as limiting,” we made this determination because “Patent Owner [did] not expressly address whether the preamble is limiting” and “ha[d] not demonstrated a ‘clear reliance’ on the preamble in the prosecution history, or that the preamble provide[d] antecedent basis for the body of the claim.” *Id.* at 23 (quoting *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1335, 1347 (Fed. Cir. 2012)).

In its Response, Patent Owner does not specifically address whether the preambles of claims 1 and 13 are limiting, noting only that “claim 13

recites ‘[a]n **ink-jet** transfer article’ in the preamble and, in the body, refers back to this requirement when it requires ‘at least one **ink**-receptive layer overlaying the opaque white layer, the at least one ink-receptive layer including a binder and a polymeric material.’” Resp. 55.

In its Reply, Petitioner argues that “the Board should maintain its initial opinion” that the preambles of claims 1 and 13 are not limiting because “[t]he body of the challenged claims recite a structurally complete invention without reference to the preamble,” and “Patent Owner did not respond to the Board’s initial opinion or offer *any* reason why the preamble should be considered a claim limitation.” *Id.* at 3 n.1, 4. Petitioner also notes that “[i]n claim 13, the phrase ‘for transferring an image to a fabric material’ merely states a purpose or intended use for the structure recited in the body of the claim.” *Id.* at 3 n.1.

In its Sur-reply, Patent Owner argues the preambles of claims 1 and 13 are limiting because “[t]he preamble is the only place in Claims 1 and 13 that uses the term ‘transfer,’” and “[t]he concept of ‘transfer’ is essential to the claims.” Sur-reply 3. According to Patent Owner:

The fact that the claimed invention is a “transfer article” explains: (1) why a “substrate” with a “substrate surface” is needed (to hold the layers prior to **transfer**); (2) why the “substrate” needs to be “removable” (so that the layers can be removed from the substrate and **transferred** to another surface); and (3) why one of the layers needs to be “opaque” (so that, when **transferred** to a fabric material, the image has a white background).

Id. at 3. Patent Owner concludes that “[t]he preamble’s reference to a ‘transfer article’ is therefore essential to understanding the requirements of

the claims,” and “Petitioner’s assertion that deleting the preamble would have no effect . . . is incorrect.” *Id.*

We do not agree with Patent Owner. As an initial matter, Patent Owner waited until the Sur-reply to address this issue with any level of specificity, which calls into question the timeliness of its argument. *See* PTAB Consolidated Trial Practice Guide (“CTPG”) (Nov. 2019) 73–74, *available at* <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“Sur-replies should only respond to arguments made in reply briefs, comments on reply declarations testimony, or point to cross-examination testimony.”); Paper 10, 10 (“any arguments not raised in the response may be deemed waived”). Nevertheless, we disagree with Patent Owner that “ink-jet transfer” is essential to claims 1 and 13. Claims 1 and 13 are not method claims. Rather, as Petitioner argues, both claims are directed to an article of manufacture made of structurally complete components that *does not require* an ink-jet transfer, even though the article may be used for such a purpose. *See* Reply 2–4; *see also* *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358–59 (Fed. Cir. 2010) (“A preamble is not regarded as limiting [] ‘when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claimed invention.’”) (citation omitted). The body of claim 1 does not reference “an ink-jet transfer” at all. *See* Ex. 1012, 11:35–41. And although claim 13 also recites that the article is “for transferring an image to a fabric material” and comprises a layer that is “ink-receptive,” these recitations are not essential to understanding the claim; nor do they show that the claim requires an ink-jet transfer. *See id.* at 12:13–14, 12:20–22. Rather, the first phrase merely recites an intended use of the article, and the second phrase merely describes

a layer's ability to receive ink. Accordingly, we determine that the preambles of claims 1 and 13 are not limiting. As such, Patent Owner's arguments that the combined teachings of Akada and Takao fail to disclose or suggest an "ink-jet transfer" article are unpersuasive. *See, e.g.*, Resp. 38, 41; Sur-reply 20–22.

Even if we were to find the preambles limiting, Petitioner establishes that an "ink-jet transfer article" would have been obvious given the prior art disclosures. *See* Pet. 30, 45 (asserting that an ordinarily skilled artisan would have recognized that Akada's and Takao's thermal transfer printing method was interchangeable with an ink jet printing method); (citing Ex. 1001 ¶¶ 120–121; Ex. 1030, 3:26–29); Reply 24 ("Akada's dye sublimation transfer sheets are 'ink-jet transfer articles' because they can effectively be printed on with ink-jet technology"), 29 (citing Ex. 1039 ¶ 27; Ex. 1019, 7:63–8:4) ("Takao itself teaches that its thermal transfer image-receiving sheet may receive the image in the form of a 'hot melt ink layer of colorant, such as a pigment'").

In its Sur-reply, Patent Owner argues that Akada's "[d]ye sublimation printing uses dye sublimation sheets that are designed for the specific purpose of sublimation dyes," and a person of ordinary skill in the art "would not expect that a sublimation dye sheet," such as Akada's, "could be used for ink-jet printing, which uses a different surface to print." Sur-reply 21 (citing Ex. 2020 ¶¶ 386, 391, 405). But Patent Owner does not offer any persuasive evidence to support its argument. Although Patent Owner cites Dr. Ellison's testimony, which refers to an article (Ex. 2019) describing differences between dye sublimation, direct to garment (DTG), and heat transfer printing methods, Patent Owner fails to direct us to any persuasive

evidence in the article or elsewhere that a sublimation dye sheet, such as Akada's, could not be used for ink-jet printing. *See generally* Resp.; Sur-Reply. In contrast, Dr. Scott relies on evidence in the prior art¹⁰ to support his testimony that ink-jet printing and dye sublimation printing were known interchangeable printing methods. Ex. 1001 ¶ 120 (citing Ex. 1030, 3:26–29 (“[I]mage transferred material . . . comprises . . . layer 22b, image layer 2a and thermoplastic resin layer 12b. The image layer 2a may be provided by any of an electrophotographic method, a thermally transferring method, a thermally sublimating method, an inkjetting method, and a cyclor method.”)). Thus, even if the preambles of claims 1 and 13 are limiting, Petitioner establishes that an “ink-jet transfer” article would have been obvious in view of the prior art disclosures.

b) Whether Petitioner establishes that Takao is analogous art

In its Preliminary Response, Patent Owner argued that Takao is non-analogous art. Prelim. Resp. 18. We disagreed, “find[ing] that Takao is at least in the same field of endeavor as the ’475 patent, i.e., image transfer to a substrate.” DI 27. Patent Owner maintains that Takao is not analogous prior art and that an ordinarily skilled artisan would not have looked to Takao to create the claimed invention because Takao is neither “from the same field of endeavor” as the ’475 patent nor “reasonably pertinent to the particular problem with which the inventor [of the ’475 patent] is involved.” Resp. 31–32 (quoting *Unwired Planet, LLC v. Google Inc.*, 841 F.3d 995, 1000–01 (Fed. Cir. 2016)); Sur-reply 4–7.

¹⁰ Sangyoji et al., US 5,204,164, issued Apr. 20, 1993 (Ex. 1030).

Petitioner replies that:

[t]he '475 patent's field of endeavor is broadly directed to thermal image transfer systems, unrestricted by the printing technology or type of ink, whether the image initially transferred to the transfer sheet (e.g., by printing) is subsequently transferred to another object, or, if subsequently transferred to another object, whether that object is fabric or a surface of some other material.

Reply 13; *id.* at 13–14 (citing Ex. 1012, 9:5–9, 9:13–15, 11:34–41, Figs. 3A–5). The '475 patent supports Petitioner's argument, describing that “[t]he ink or toner may be applied utilizing *any conventional method* such as an ink jet printer or an ink pen or color copy or a laser printer,” that “[t]he ink may be comprised of *any conventional ink formulation*,” and “that the substrate to which the image is transferred can be ‘cloth, *paper and other flexible or inflexible materials*.’” Ex. 1012, 9:5–9, 9:13–15; Reply 13–14 (emphasis added). Accordingly, the '475 patent's field of endeavor broadly encompasses thermal image transfer systems, including image transfer to a substrate.

Petitioner further contends that Takao “is explicitly directed to a thermal image transfer system.” Reply 14 (citing Ex. 1019, 1:6–20, 13:24–65). Petitioner also points to similarities between Takao and the '475 patent, including that both teach “a multi-layered sheet comprised of a paper substrate,” a white pigment to improve image quality, and a receptive layer to receive the ink or dye transferred from a thermal sheet. *Id.* at 15–16 (citing Ex. 1001 ¶¶ 133–135; Ex. 1019, 2:12–58, 5:26–28, 6:6–9).

Patent Owner argues that Takao is not in the same field of endeavor as the '475 patent because “Takao involves the **formation** of an image onto a sheet using a thermal print head,” but “the image . . . **is never transferred to**

a substrate.” Sur-reply 4–5; Resp. 31. Patent Owner also disputes Petitioner’s assertion that both Takao and the ’475 patent are “directed to thermal image transfer systems” because “each of these words has a different meaning in the two patents.” Sur-reply 5 (quoting Reply 13). Specifically, Patent Owner asserts that in Takao, “image transfer” and “thermal” relate to *printing* an image, whereas in the ’475 patent the terms relate to *transferring* an image *after* printing. *Id.* Patent Owner also asserts that even though some claims of the ’475 patent may not require “subsequent transfer to another object,” “the specification discloses that the primary purpose of the claimed invention is **transferring** a printed image to another (dark-colored) substrate,” and an ordinarily skilled artisan “would not look to Takao because it is never transferred or ‘applied’ to another surface.” *Id.* at 5–6.

Patent Owner’s arguments, however, define the field of endeavor too narrowly, focusing on specific, purported distinctions between Takao and the ’475 patent rather than acknowledging the broad similarities and subject matter overlap between the disclosures. “The field of endeavor of a patent is not limited to the specific point of novelty, the narrowest possible conception of the field, or the particular focus within a given field.” *Unwired Planet*, 841 F.3d at 1001. Rather, we “construe the scope of analogous art *broadly*,” such that ““familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle.”” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010) (quoting *KSR*, 550 U.S. at 402) (emphasis added). Here, Takao describes “a thermal transfer image-receiving sheet for use in a thermal dye transfer system” and

the background art as including “dyes as colorants . . . thermally transferred from a thermal transfer sheet . . . onto a thermal transfer image-receiving sheet comprising a substrate sheet, such as paper or a plastic film, bearing a dye-receptive layer dyable with a sublimable dye, thereby forming various full-color images on the image-receiving sheet.” Ex. 1019, 1:6–20. Takao also teaches a multi-layer sheet including a substrate layer, a layer that includes white pigment to improve image quality, and a layer that receives dye transferred from a thermal transfer sheet. Although we acknowledge, as does Petitioner, that Takao does not explicitly disclose taking a piece of paper that has been coated for printing an image thereon and transferring the image off of it to another product or to another object, we agree with Petitioner that it does not take Takao “outside the field of endeavor here,” i.e., thermal image transfer systems. Tr. 20:25–21:2; *see* Ex. 1019, 7:67–8:4 (Takao describing “a hot-melt thermal transfer sheet, comprising a substrate bearing, coated thereon, a hot melt ink layer of a colorant, such as a pigment, held by a hot-melt binder, wherein upon heating the ink layer, in its entirety, is transferred to an object.”).

In view of the foregoing, we determine that Petitioner establishes that Takao is analogous art at least because it is in the same field of endeavor as the ’475 patent. For the reasons discussed below, we also agree with Petitioner that Takao is analogous art because it is reasonably pertinent to a particular problem with which the ’475 patent’s inventor was concerned.

In particular, we agree with Petitioner that both Takao and the ’475 patent address problems related to “improving the visual quality of an image transferred to a substrate by hiding certain visual elements of the substrate, and even more particularly to ‘offering a high contrast between an image

area and a non-image area and a good appearance.” Reply 17; *see* Ex. 1019, 5:66–6:3 (Takao explaining that “[t]he whiteness-improving layer . . . can serve to improve the whiteness of the imaging-receiving surface of the thermal transfer-image receiving sheet, offering a high contrast between an image area and a non-image area”); Ex. 1042, 32:5–17, 33:2–9 (inventor testimony that “the concept was . . . starting with the transfer sheet and adding white pigments so that when you did transfer, you could see it on a dark shirt, dark fabric.”). As Petitioner points out, both the ’475 patent and Takao “address the problem by incorporating white pigment (titanium oxide in particular) in a layer of a multi-layer sheet used in a thermal transfer system.” Reply 17; *see* Ex. 1012, 12–16; Ex. 1019, 2:51–57, 5:26–27.

Patent Owner argues that “Takao is not pertinent to [transferring a printed image from a sheet to a dark-colored fabric] because it (1) does not involve transfer; (2) does not involve dark-colored substrates; (3) does not involve fabric; and (4) uses water-soluble polymers not suitable for fabric applications.” Resp. 32 (citing Ex. 2020 ¶ 364); Sur-reply 6–7. “But a reference can be analogous art with respect to a patent even if there are significant differences between the two references.” *Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1361 (Fed. Cir. 2020) (citing *In re ICON Health & Fitness, Inc.*, 496 F.3d 1374, 1380 (Fed. Cir. 2007)). As applied here, even accepting Patent Owner’s purported differences between Takao and the ’475 patent, the “pertinent similarities” between the whiteness-improving layer of Takao’s thermal transfer image-receiving sheet and the white layer of the ’475 patent’s image transfer sheet render Takao reasonably pertinent to one or more of the problems to which the ’475 patent pertains. *Donner Tech.*, 979 F.3d at 1361.

c) Whether Petitioner establishes that the combination of Akada and Takao discloses or suggests an “opaque . . . layer” that melts and mixes

Patent Owner argues that Petitioner’s proposed combination of Akada and Takao would not have rendered obvious the distinct “opaque . . . layer,” as claims 1 and 13 recite. Resp. 32–37; Sur-reply 12–17. Specifically, Patent Owner argues that Petitioner fails to meet its burden because (1) neither Akada nor Takao discloses an opaque layer, and (2) Petitioner does not show that Akada or Takao discloses a white layer that melts and mixes and provides a white background. Resp. 32–37. We address each issue below.

i. Whether Akada or Takao discloses or suggests an opaque layer

As discussed above, with regard to an opaque layer, Petitioner directs us to Akada’s teaching of using a white pigment for improving the whiteness of its image-receiving layer, and accentuating the sharpness and fineness of the images. Pet. 33. Petitioner also relies on Takao’s disclosure of a “whiteness-improving layer” independent from the image-receiving surface, to hide irregularities of the substrate sheet, and Takao’s statement that the process of adding white pigment can result in a white layer that is “opaque.” Pet. 34; Reply 12; Ex. 1019, 5:13–19.

Patent Owner argues neither Akada nor Takao discloses or suggests an opaque layer. Resp. 33–35; Sur-reply 15–18.¹¹ As an initial matter,

¹¹ For the first time in its Sur-reply, Patent Owner argues that we should construe the term “opaque.” Sur-reply 12–13. According to Patent Owner, “opaque” means “impenetrable to light.” Sur-reply 12–15. Patent Owner contends construction is necessary because “[f]or the first time in its Reply, Petitioner urges the adoption of a definition of ‘opaque’ that is at odds with

Patent Owner argues that Akada does not disclose a layer with pigment that is separate from an ink-receiving layer, but instead teaches incorporating white pigment into its image-receiving layer. Resp. 33; Sur-reply 4. But Petitioner relies on the combined teachings of Akada and Takao, not Akada alone, for disclosing the “opaque . . . layer” limitation. Pet. 31–35. The test for obviousness is not whether any one or all of the references expressly suggests the claimed invention, but whether the claimed subject matter would have been obvious to those of ordinary skill in the art in light of the combined teachings of those references. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Here, Petitioner relies on Takao, not Akada, for a separate or independent layer with white pigment, arguing, for example, that Takao discloses an independent layer to provide “an improvement in whiteness of the image-receiving surface.” Pet. 34 (citing Ex. 1019, 1:66–2:6). Consistent with Petitioner’s argument, Takao also discloses that its whiteness-improving layer and a fluorescent brightening agent may form “a white opaque layer.” Ex. 1019, 5:4–25.

this plain and ordinary meaning,” proposing “that a layer is ‘opaque’ if it has any white pigment in it.” *Id.* at 13 (citing Reply 11). Patent Owner explains that “[t]he claims and file history [] demonstrate that a layer is not ‘opaque’ simply because it has ‘any amount’ of pigment,” because “the claims require that ‘the opaque white layer’ contain enough pigment to ‘provide[] a substantially white background for received indicia.’” *Id.* at 14 (citing Ex. 1012, 12:13–22 (claim 13); Ex. 1013, 198, 200). Patent Owner’s argument is too late and, therefore, is waived. *See* CTPG 73–74; Paper 10, 10. Even if we considered Patent Owner’s argument, we see no need to separately construe the term “opaque” in view of our construction of the phrase “white layer,” which corresponds to the claim terms “opaque first layer” (claim 1) and “opaque white layer” (claim 13), and which Petitioner Patent Owner treat synonymously with “opaque background.” Pet. 9–11, 31–35; Resp. 21–23.

Patent Owner next contends that “Petitioner **does not allege** . . . that Akada teaches that the transfer sheet should incorporate sufficient pigment to create an **opaque** white layer.” Resp. 33 (citing Pet. 33). Patent Owner argues that Akada’s description of admixing white pigment in the image-reception layer for improving whiteness thereof does not disclose “an **opaque** layer” or “using pigment to create an opaque background for an image **on dark fabrics.**” *Id.* at 33–34 (citing Ex. 1027, 22:39–48).

At the outset, we disagree with Patent Owner because, as discussed above, Petitioner relies on the combination of Akada and Takao, not Akada alone, for disclosing an “opaque . . . layer” as recited. *See Keller*, 642 F.2d at 425. Moreover, Akada teaches that its white pigment improves the whiteness of the image-reception layer and accentuates the sharpness and fineness of the images, and is the same type of pigment (titanium oxide) that the ’475 patent discloses for creating the opaque background. *Compare* Ex. 1027, 5:26–34, 22:39–44, *with* Ex. 1012, 2:57–59. Akada further discloses using the same pigment used in the ’475 patent, and using an amount of the pigment sufficient to, *inter alia*, improve the whiteness of the image-reception layer. Accordingly, Akada at least implies or suggests that its image-reception layer is opaque.

As Petitioner points out, the ’475 patent describes the amount of white pigment used in an “opaque . . . layer” in broad terms, without providing a limiting definition. *See* Reply 9–10; Ex. 1012, 4:12–16 (5%–35% by volume), 4:29–31 (10–40% by weight), 4:16–19, 8:14–19 (0–50% by weight), 4:26–28 (0–7% by weight total ash content), 4:9–11 (20% by weight), 6:52–54 (20% by volume), 9:52–54 (30%). Further, Dr. Ellison admits that any of the ranges of white pigment disclosed in the ’475 patent

would have been sufficient to perform the function of providing a layer with an opaque background as claimed, thereby undermining Patent Owner's argument that Akada does not contain a sufficient amount of white pigment to form an opaque layer. *See* Ex. 1040, 88:1–19, 113:14–24.

Patent Owner argues that Takao is deficient because it “does not state that its invention incorporates an ‘opaque’ layer, nor does Petitioner assert that a [person of ordinary skill in the art] would understand that it necessarily discloses such a layer in order to achieve the identified functions.” Sur-reply 17. Petitioner, however, persuasively argues that Takao teaches or at least suggests an opaque layer because it expressly describes adding a separate, independent whiteness-improving layer including white pigment made of titanium oxide, proportioned at percentages (14%–23%) squarely within the ranges the '475 patent describes. *See* Reply 12 (citing Ex. 1019, 5:54–57, 8:24–9:45); Ex. 1019, 1:58–2:6, 5:66–6:3. And, as Petitioner points out, Takao states that the process of adding white pigment can result in a white layer that is “opaque.” Ex. 1019, 5:13–19; *see* Reply 12; *see also* Ex. 1019, 14:46–48 (providing criteria for evaluating example thermal transfer sheets, including an X where “[s]eparation occurred . . . between the white opaque layer and the receptive layer”). That Takao's whiteness-improving layer or white opaque layer may serve a different purpose than the '475 patent's white layer does not change our view. “In determining whether the subject matter of a patent claim is obvious, neither the particular motivation nor the avowed purpose of the patentee controls.” *KSR*, 550 U.S. at 419. Rather, “[u]nder the correct analysis, any need or problem known in the field of endeavor at the time of

invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *Id.* at 420.

Patent Owner also argues that Takao is deficient because Takao does not use white pigment to create a white background when transferring an image, for example to a dark-colored fabric. Resp. 35; Sur-reply 17. We disagree. As discussed above, claims 1 and 13 recite articles of manufacture and do not require transferring an image, let alone transfer to a dark-colored fabric. *See supra* § II.D.3a. For all of the foregoing reasons, Petitioner shows that Akada and/or Takao discloses or suggests a white layer or “opaque . . . layer.”

ii. Whether Akada or Takao discloses a white layer that “melts and mixes”

For the first time in the Sur-reply, Patent Owner argues that Petitioner makes no showing that either Akada or Takao discloses a white layer “that melts and mixes,” the layer having “a concentration or configuration of pigment providing a white background.” Sur-reply 18–20. For example, Patent Owner asserts that Akada and Takao use pigment not for providing a white background but for other purposes. *Id.* at 18 (citing Ex. 1019, 5:26–28, 5:66–6:3; Ex. 1027, 22:39–44). Patent Owner also asserts that Takao does not teach a white layer that melts and mixes because the layer in question is never heat-applied and, thus, cannot melt and mix with another layer. *Id.* at 19. Patent Owner further argues that the proposed combination ignores the unpredictable nature of the chemical arts, and that Petitioner does not explain in adequate detail the specifics of the proposed combinations—including what each layer of the proposed combination

would be composed of and how the melting and mixing would be achieved. *Id.* at 19–20.

Initially, we note that Patent Owner has waived these arguments because Patent Owner did not raise them in the Response. *See* CTPG 73–74; Paper 10, 10. Even if Patent Owner had timely raised these arguments, however, they still would not change the outcome here. First, as discussed above, the avowed purpose of the patentee does not control an obviousness determination; rather, any need or problem addressed by a prior art reference can provide a reason for combining the elements. *KSR*, 550 U.S. at 419–20. As applied here, even if Patent Owner is correct that Akada and Takao use white pigment for a purpose other than a providing a white background, it does not preclude Petitioner’s showing of obviousness.

Second, Petitioner shows that Akada and Takao both disclose or suggest a white layer that melts and mixes when heat is applied thereto. For example, Dr. Scott testifies that “Akada teaches that transfer of the image may be accomplished by means of pressure and heat” because “Akada teaches application to a substrate ‘pressurized together at 160°C[] by means of heated pressure rolls’” and “application ‘under heat and pressure at 140° C.’” Ex. 1001 ¶ 144 (citing Ex. 1027, 35:66–67, 37:9–10, 37:62–63, 41:44–45, 47:31–32); *see* Ex. 1027, 2:63–3:2, 27:63–28:4, 32:10–23, 32:34–44. Dr. Scott further testifies credibly that,

to the extent that melting and mixing occurs, as asserted by the inventor for the ‘475 Patent, the layers described in Akada as modified by Takao will behave in the same manner (*i.e.*, melt and mix) because Akada as modified by Takao discloses adjacent layers having the same types of materials as described in the ‘475 Patent, and Akada as modified by Takao discloses application temperatures that fall within the range described in the ‘475

Patent and which would apply heat to the heat-transfer sheet in the same temperature range as that described in the '475 Patent. Ex. 1001 ¶ 149; *see id.* ¶¶ 145–47 (explaining how Akada as modified with Takao teaches layers having same materials as in the '475 patent). Takao also teaches that its white layer melts and mixes, for example, with its description of “a hot melt ink layer of a colorant, such as a pigment, held by a hot-melt binder, wherein upon heating the ink layer, in its entirety, is transferred to an object.” Ex. 1019, 8:1–4.

Third, Patent Owner disputes the predictability and alleged lack of detail in Petitioner’s proposed combination, but Petitioner does not propose physically combining Akada’s and Takao’s sheets or layers thereof, nor does an obviousness determination require that. “[A] determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements,” nor does it require that “the features of a secondary reference may be bodily incorporated into the structure of the primary reference.” *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (citations omitted); *MCM Portfolio LLC v. Hewlett-Packard Co.*, 812 F.3d 1284, 1294 (Fed. Cir. 2015) (quoting *Keller*, 642 F.2d at 425). Accordingly, Petitioner shows that the combined teachings of Akada and Takao disclose a white layer that melts and mixes.

d) Whether Akada teaches away from adding pigment to its protective layer or intermediate layer

Patent Owner argues “a [person of ordinary skill in the art] would not have been motivated to add pigment from Takao to Akada’s protective layer or intermediate layer and would not have expected that such a combination would be successful” because Akada teaches away from borrowing pigment from Takao and placing it into Akada’s protective or intermediate layer.

Resp. 36 (citing Ex. 1027, 26:12–15). According to Patent Owner, an ordinarily skilled artisan would have expected that adding pigment to Akada’s protective layer would obscure the image and would not have had reason to include an opaque intermediate layer because Akada teaches that its intermediate layer “may be made preferably and at least substantially transparent.” *Id.* at 36–37 (citing Ex. 2020 ¶¶ 378–79). In addition, Patent Owner asserts that an ordinarily skilled artisan would have expected an opaque intermediate layer to obscure the image given Akada’s teaching of an image-side down application. *Id.* at 37 (citing Ex. 2020 ¶ 280).

Petitioner replies that its proposed combination does not require white pigment to be incorporated into Akada’s intermediate or protective layer because an ordinarily skilled artisan would have understood from Takao that an additional layer with white pigment could be added to Akada’s transfer sheet. Reply 19 (citing Ex. 1001 ¶¶ 117, 268, 309). Nevertheless, Petitioner argues that even if Akada’s protective layer includes white pigment and may end up above the transferred image before application to a substrate, this does not teach away from the claimed invention because the ’475 patent itself teaches a peel-last method in which the white layer is above the image when transferred to a substrate. *Id.* at 20–21 (citing Ex. 1012, 11–32; Ex. 1057, 46:14–49:25, 50:8–9). Petitioner also argues that Akada does not require its intermediate layer to be transparent, but instead discloses one embodiment, which Petitioner does not rely upon, in which the intermediate layer is preferably transparent. *Id.* at 21–22. Finally, Petitioner explains that the challenged claims are apparatus claims without regard to how the transfer sheet is ultimately used to transfer the image to the substrate. *Id.* at 21.

Patent Owner responds that a person of ordinary skill in the art would have been dissuaded from making Akada's intermediate or protecting layers opaque "because he would expect that the image would not be visible through the opaque layer," and because the layer is not transferred in Akada's second intermediate layer embodiment. Sur-reply 9–11 (citing Ex. 1027, 17:47–49, 17:59–64, 26:12–15; Ex. 2020 ¶ 378). According to Patent Owner, Ms. Schwendimann's recognition that "the image could migrate through the transfer during application to rest on top of the white layer. . . . would not have been obvious to a [person of ordinary skill in the art]." *Id.* at 10. Patent Owner also asserts that an ordinarily skilled artisan "would not be motivated to move the protecting layer (with pigment) to a position beneath the image because . . . the 'protecting layer' would not perform its function of protecting the image." *Id.* at 10 (citing Ex. 1027, 26–12–15, 17:59–64). And Patent Owner contests Petitioner's assertion that Akada teaches an embodiment with a protecting layer positioned below the image because such an embodiment contradicts Akada's teachings. *Id.* at 10–11 (citing Ex. 1027, 17:55–64, Fig. 16; Ex. 1039 ¶ 17).

We do not agree that Akada teaches away. As an initial matter, Patent Owner's arguments mischaracterize Petitioner's proposed combination as requiring the pigment of Takao to be placed into the intermediate or protecting layer of Akada. *Compare* Resp. 36, *with* Reply 18. Petitioner does not propose that an ordinarily skilled artisan would have modified Akada by adding Takao's pigment to one of Akada's layers resulting in a protecting layer with pigment obscuring the image. Rather, as Petitioner explains, "Akada already includes white pigment (titanium oxide) in its image-receptive layer, so there is no need to 'borrow it' from Takao." Reply

18 (citing Ex. 1019, 1:66–2:6). Additionally, Petitioner argues that based on the teachings of Takao, a person of ordinary skill in the art would have been motivated to mix white pigment in an *additional middle* layer, between the substrate and image-receiving layer, in Akada. *Id.* at 18–19 (distinguishing the additional middle layer from the intermediate layer and protecting layer). Patent Owner’s arguments do not address this assertion.

In addition, to teach away, a reference must discourage one of ordinary skill in the art from following the path set out in the reference, or lead that person in a direction divergent from the path taken by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994) (“[A] reference will teach away if it suggests that the line of development flowing from the reference’s disclosure is unlikely to be productive of the result sought by the applicant.”). “A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not ‘criticize, discredit, or otherwise discourage’ investigation into the invention claimed.” *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 567 F.3d 1314, 1327 (Fed. Cir. 2009) (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004)). Patent Owner does not identify any teaching in Akada that either requires its intermediate or protective layers to be transparent or discourages making Akada’s intermediate or protective layers opaque. And our independent review of Akada does not reveal any such teaching. The fact that in a certain embodiment, Akada’s intermediate layer *may* be made at least substantially transparent does not amount to a clear discouragement, or teaching away from an opaque intermediate layer. Moreover, Petitioner’s arguments do not rely on Akada’s embodiment that prefers a transparent

intermediate layer arranged below the parting agent layer and that remains with the sheet after peeling. Reply 22; Ex. 1027, 17:41–49, Fig. 17.

Patent Owner's arguments also fall short because they focus only on certain descriptions in Akada without considering the entirety of the reference. For example, Patent Owner asserts that Akada teaches applying the image-reception layer and protecting layer shown in Figure 16 image-side down. Sur-reply 11. But, as Petitioner and Dr. Scott point out, Akada also teaches applying sheet layers image-side up in a peel-first method. Reply 25–26; Ex 1039 ¶ 17. For example, Akada describes an arrangement where the intermediate and protective layers are below the image-receiving layer and above a parting agent layer, and the intermediate and protective layers may be peeled off conjointly with the image-receiving layer and applied image-up (face up from the receiving object), such that the intermediate and protective layers would end up between the image-receiving layer and the receiving object (for example, a shirt). Ex. 1027, 27:45–28:6, Fig. 20; *see* Ex. 1001 ¶ 73 (Dr. Scott's testimony regarding Akada's peel-first method). Dr. Scott credibly testifies that using this arrangement and method would have resulted in protective and intermediate layers beneath the image-reception layer during application, with the protective and intermediate layers still performing their intended purposes without obscuring the image. Ex. 1039 ¶ 17 (citing Ex. 1027, 27:57–28:3, Ex. 1001 ¶ 73). On the other hand, Patent Owner and Dr. Ellison do not address Akada's peel first embodiment or direct us to persuasive evidence to support the assertion that making the intermediate or protective layer opaque would have expectedly resulted in an image that is obscured or not visible. *See, e.g.*, Sur-reply 10–11 (discussing Akada's Figure 16, but not addressing

the embodiment on which Petitioner relies); Ex. 2020 ¶ 378 (citing Ex. 1027, 26:12–15, but failing to address Ex. 1027, 27:45–28:6). Given the foregoing, we find that Akada does not teach away from adding pigment to its intermediate or protecting layers.

e) Whether Petitioner establishes that a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takao to arrive at the claimed invention

Patent Owner argues that Petitioner fails to show why a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takao to arrive at the invention of claims 1 and 13. Resp. 37–41. Patent Owner first provides a high level characterization of Petitioner’s proposed combination and the claimed invention:

Petitioner asks a PHOSITA to take a reference that is all about printing ID cards (all claims of Akada) and combine it with an example that is all about printing an image onto a sheet of paper (all claims of Takao) to come up with an invention that involves printing an image and transferring it onto a dark-colored fabric using heat (the ‘475 Patent).

Id. at 37–38. But Petitioner’s combination does not relate to combining a printed ID card with an example about printing an image on a sheet of paper. Rather, Petitioner’s combination modifies Akada’s image transfer sheet, in view of Takao’s broad teaching of a separate, independent layer with white pigment for improving whiteness, to incorporate Takao’s white pigment into Akada’s intermediate or protecting layer, or to add an additional distinct whiteness-improving layer to Akada’s sheet resulting in a layer that provides better contrast for the printed image. *See, e.g.*, Pet. 34–35. Moreover, claims 1 and 13 are directed to articles of manufacture, not method claims,

and do not require printing an image onto a sheet of paper or transferring the image onto a dark-colored fabric. *See* Ex. 1012, 11:34–41, 12:13–22.

Patent Owner also argues that a person of ordinary skill in the art would not have looked to either Takao or Akada to solve the problems the '475 patent solves. Resp. 38–40. In particular, Patent Owner asserts that a POSITA would not have looked to Takao or Akada to solve problems associated with (1) transferring an image from a sheet to a dark-colored fabric or object using heat, because neither reference address this; or (2) ink-jet printing an image, because both Akada and Takao use a totally different, unique type of dye sublimation printing and heat from a thermal print head to print an image. *Id.*

To the extent Patent Owner is making a nonanalogous art argument, we are not persuaded for reasons similar to those we discuss above. *See supra* § II.D.3.b). Moreover, as Petitioner argues and as we discuss above, Patent Owner's arguments are flawed because claims 1 and 13 do not require a dark-colored fabric or object, nor do they require ink jet printing or image transfer. *See* Reply 22–25; *supra* §§ II.C.1, II.D.3.a. Nevertheless, as we explain above, Petitioner establishes that the combined teachings of Akada and Takao disclose or suggest “an ink-jet transfer article.” *See supra* § II.D.3.a. And, as Petitioner points out, Akada does not restrict its transfer sheet from being used on dark-colored objects, but rather describes that it can be used with *any* kind of material. Reply 23; Ex. 1027, 2:30–37. Patent Owner's arguments fall short as well because the avowed purpose of the patentee does not control an obviousness determination; rather, any need or problem a prior art reference addresses can provide a suitable reason for

combining the elements to arrive at the claimed invention. *KSR*, 550 U.S. at 419–20.

Patent Owner also argues that Petitioner’s combination is defective because Akada is not a single image-transfer sheet, but instead requires the use of a separate adhesive sheet and the ’475 patent “seeks to avoid using multiple sheets.” Resp. 40. Patent Owner’s argument, however, disregards Akada’s embodiments disclosing the adhesive layer integrated into the transfer sheet. Ex. 1027, 30:55–68, 23:60–62 (“In some cases, the intermediate layer may additionally function as the adhesive layer.”); Reply 27–28. Patent Owner’s argument also mischaracterizes Akada as requiring a separate adhesive sheet, but Akada teaches that such a sheet is optional. *See id.* at 27:62:68 (discussing “a case where an adhesive agent layer 306 had preparatorily [been] provided between image-reception layer 302 and sheet-like substrate 301”), 30:55–57 (referring to “where the thus-peeled off film carrying the images is provided beforehand with an adhesive layer”).

Patent Owner additionally argues that Petitioner’s combination is defective because neither Akada nor Takao discloses or explains how to include an opaque layer without covering up the image when transferred to another surface. Resp. 40. This argument, however, focuses on one of Akada’s specific “peel-last” embodiments, without considering Akada’s disclosure of “peel-first” embodiments. *See* Reply 25–26. As Petitioner and Dr. Scott point out, and as we discuss above, Akada discloses a “peel-first” application method resulting in the protecting and intermediate layers being positioned beneath the image-receiving layer, such that they would not have obscured the image. *See* Reply 25–27; Ex. 1001 ¶ 73; Ex. 1027, 27:45–28:6, Fig. 20; Ex. 1039 ¶ 17; *supra* § II.D.3.d.

Patent Owner next asserts that Petitioner's combination is defective because it does not also borrow Takao's water-soluble fluorescent brightening agent. Resp. 41 (citing Ex. 1019, 5:4–9; Ex. 2020 ¶ 381); Sur-reply 8. Patent Owner explains that, “[t]herefore, the benefit of using a separate white layer discussed in Takao is *completely inapplicable* to Akada,” and “Akada would not realize ‘an improvement in whiteness of the image-receiving surface’ because, in Akada, there would be no water-soluble materials to allow migration of any ‘water-soluble fluorescent brightening agent’ into the image-receiving surface.” Sur-reply 9. Patent Owner continues that “Petitioner has identified nothing about Takao's separate white layer that [an ordinarily skilled artisan] would view as an improvement to Akada.” *Id.*

Contrary to Patent Owner's arguments, however, Petitioner's combination does not propose, nor does a determination of obviousness require, bodily incorporating Takao's whiteness layer, including its water-soluble brightening agent, into Akada's image transfer sheet. *See MCM Portfolio*, 812 F.3d at 1294; *Keller*, 642 F.2d at 425. In other words, we agree with Petitioner that “Takao's use of a brightening agent is immaterial to . . . the teaching” for which Petitioner relies upon Takao. Reply 29 (citing Ex. 1039 ¶ 28). In particular, Petitioner's combination relies on Takao “for its broad teaching that it is advantageous to include white pigment (titanium oxide) in a layer *separate from* the image-receptive layer.” Reply 18; *compare* Ex. 1027, 1:43–47 (describing prior art as improving whiteness in the image-receiving sheet by adding fluorescent brightening agent or white filler or pigment to the image-receptive layer), *with id.*, 1:58–65 (summarizing Takao's invention as including a separate

whiteness-improving layer).¹² And, as Dr. Scott credibly opines, an ordinarily skilled artisan would have understood that “Takao’s choice to *also* include a fluorescent brightening agent in the same layer with the white pigment would not detract from that teaching.” Ex. 1039 ¶ 28.

Similarly, Patent Owner argues that Petitioner fails to show a reason an ordinarily skilled artisan would have modified Akada to include an opaque layer that is separate from the image-reception layer “because the reason Takao uses a separate white layer”—an improvement in whiteness—is “inapplicable to Akada.” Sur-reply 8–9. According to Patent Owner, “Akada would not realize ‘an improvement in whiteness of the image-receiving surface because, in Akada, there would be no water-soluble materials to allow migration of ‘any water-soluble fluorescent brightening agent’ into the image-receiving surface.” *Id.* at 9 (noting that Takao discloses water-soluble components but Akada does not). This argument mischaracterizes Petitioner’s proposed combination as requiring Takao’s pigment to be incorporated into Akada’s intermediate or protective layer. Rather, as Petitioner explains, a person of ordinary skill in the art “would readily understand from Takao’s teaching not only that white pigment could be added to the existing intermediate layer 304 or protective layer 305, but that an *additional* layer with white pigment (i.e., titanium oxide) could be added to Akada’s transfer sheet.” Reply 19 (citing Ex. 1001 ¶¶ 117, 268, 309); *see id.* at 18 (“Akada already includes white pigment (titanium oxide)

¹² In the Oral Hearing, both parties agreed that Takao’s fluorescent brightening agent (described as being in the prior art) is the same as Takao’s whiteness layer except that the fluorescent brightness layer is not included in its own layer but in the image receiving layer. *See* Tr. 14:18–15:17, 36:1–18.

in its image-receptive layer, so there is no need to ‘borrow it’ from Takao,” which is being relied upon “for its broad teaching that it is advantageous to include white pigment (titanium oxide) in a layer *separate from* the image-receptive layer.”). For all of the foregoing reasons, Petitioner shows that an ordinarily skilled artisan would have had reason to combine the teachings of Akada and Takao.

f) Whether Petitioner shows that an ordinarily skilled artisan would have expected success in adding a “new whiteness-improving layer” to Akada

Patent Owner argues that “there is no basis for the Board to conclude that a [person of ordinary skill in the art] would expect to succeed in adding a ‘new whiteness-improving layer’ to Akada” because neither Petitioner nor Dr. Scott provides evidence to support the assertion that “‘an additional layer with white pigment (i.e., titanium oxide) could be added to Akada’s transfer sheet.’” Sur-reply 11–12 (citing Reply 19; Ex. 1001 ¶¶ 117, 268, 309). We disagree. For example, in the Petition, Petitioner cites passages from Akada and Takao showing the similarities and combinability of the two references. Pet. 34 (citing Ex. 1019, 5:26–28; Ex. 1027, 22:39–44, Figs. 15–17). Petitioner also directs us to portions of Dr. Scott’s testimony, which explain in detail why an ordinarily skilled artisan would have had reason to make the proposed combination with a reasonable expectation of success. *Id.* (citing Ex. 1001 ¶¶ 132–35; Ex. 1019, 1:6–8, 1:59–62, 1:66–2:6, 2:54–57, 3:9–25; Ex. 1026, Abstract).

Notably, Petitioner shows that the proposed combination would not have been uniquely challenging or anything more than a routine exercise of combining familiar elements according to known methods or applying known techniques to achieve predictable results. *See KSR*, 550 U.S. at 416–

17 (explaining as examples of combinations likely to be obvious “[t]he combination of familiar elements according to known methods . . . when it does no more than yield predictable results” and “the mere application of a known technique to a piece of prior art ready for the improvement”); *Leapfrog Enters., Inc. v. Fisher-Price, Inc.*, 485 F.3d 1157, 1162 (Fed. Cir. 2007) (citing *KSR*, 550 U.S. at 418). We find no reason why incorporating Akada’s white pigment into its intermediate or protecting layer or adding a separate or distinct whiteness-improving layer in Akada given Takao’s teachings would have been unpredictable to the skilled artisan. As such, Petitioner shows that the ordinarily skilled artisan would have reasonably expected to succeed in arriving at the claimed subject matter.

g) Whether Petitioner establishes that Akada or Takao discloses claim 13’s “at least one ink-receptive layer”

Patent Owner additionally argues that neither Akada nor Takao teaches “at least one ink-receptive layer” as recited in claim 13. Resp. 41; Sur-reply 22–23. For example, Patent Owner argues that “Akada’s image-reception layer . . . receives ‘dyestuff’ rather than ink.” Sur-reply 22–23 (citing Pet. 48; Ex. 1027, 2:51–63; Ex. 2020 ¶ 391); Resp. 41.

Patent Owner’s argument is not persuasive because it focuses on one particular passage from Akada without appreciating the entirety of what Akada would have taught or suggested to one of ordinary skill in the art. Here, Petitioner persuasively argues that Akada’s image-reception layer 302 teaches or at least suggests “at least one ink-receiving layer” because “the ink-receiving layer 306 of the ‘475 Patent and the image-reception layer 302 of Akada are both comprised of a polyurethane resin or polyamide resin,” and “Akada’s image-reception layer 302 is configured to receive indicia by

ink-jet just as the ink-receiving layer 306 of the ‘475 Patent is configured to receive the same.” Pet. 45, 48–49; *see* Ex. 1001 ¶¶ 198–202, 205, 207–208; Ex. 1012, 5:12–13; Ex. 1027, 21:48–22:38, Figs. 15–18, 24). Petitioner also persuades us that “[s]ublimation dyes,” such as the one described in Akada, “are commonly printed to transfer sheets in the form of ink.” Reply 29 (citing Ex. 1039 ¶ 27). And, as Petitioner further argues, Takao also teaches or at least suggests “at least one ink receptive layer” with its description of a hot-melt ink layer of colorant, such as a pigment. *See* Reply 29–30; citing Ex. 1019, 7:63–8:4).¹³

h) Conclusion as to claims 1 and 13

For all of the foregoing reasons, we are persuaded by Petitioner’s arguments and evidence demonstrating that a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takao, with a reasonable expectation success in arriving at the subject matter claims 1 and 13 recite. As noted above, we also agree with Petitioner’s arguments and evidence that Akada and Takao teach or suggest all of the limitations of claims 1 and 13. As a result, Petitioner establishes, by a preponderance of evidence, that claims 1 and 13 would have been obvious over the combination of Akada and Takao.

4. Claims 2, 3, 5–12, 14, 15, 18

Petitioner also alleges that the combined teachings of Akada and Takao would have rendered obvious the subject matter of dependent claims

¹³ According to Patent Owner, Petitioner’s argument regarding Takao is improper new argument raised for the first time in the Reply. Sur-reply 22. We do not agree because Petitioner’s argument responds to Patent Owner’s assertion in the Response that the image-reception layers in Akada and Takao are not “ink-receptive” layers, but instead receive “dye.” Resp. 41.

2, 3, 5–12, 14, 15, and 18. Pet. 37–44, 49–52. Patent Owner does not separately address these dependent claims and, therefore, has forfeited any arguments based on these uncontested claims. *See* Resp. 41–42; *cf. In re NuVasive*, 842 F.3d 1376, 1381 (Fed. Cir. 2016). Instead, Patent Owner relies on the same arguments addressed above in our discussion of claims 1 and 13, challenging Petitioner’s arguments and evidence regarding whether Akada and Takao teach the limitations of these claims, whether a person of ordinary skill in the art would have had reason to combine the teachings of Akada and Takao, and whether a person of ordinary skill in the art would have had a reasonable expectation of success.

We have reviewed the information Petitioner provides, including the relevant portions of Dr. Scott’s declarations, and agree with Petitioner’s undisputed arguments and evidence that Akada and Takao teach or suggest all of the limitations in claims 2, 3, 5–12, 14, 15, and 18. Pet. 37–44, 49–52 (and evidence cited therein). Additionally, for the same reasons discussed above, Petitioner’s arguments and evidence persuade us that a person of ordinary skill in the art would have had reason to combine the disclosures set forth in Akada and Takao, and that a person of ordinary skill in the art would have had a reasonable expectation of success in achieving the claimed invention. We, therefore, find Petitioner establishes, by a preponderance of the evidence, that claims 2, 3, 5–12, 14, 15, and 18 are unpatentable as obvious in view of the combined teachings of Akada and Takao.

E. Alleged Obviousness over Akada, Takao, and Kronzer (claim 4)

Petitioner contends that the subject matter of claim 4 would have been obvious in view of Akada, Takao, and Kronzer. Pet. 52. Petitioner directs us to portions of Akada, Takao, and Kronzer that purportedly disclose claim

4's additional limitation. *Id.* at 52–53. Petitioner also relies on Dr. Scott's testimony to support its arguments. *See id.* (citing Ex. 1001 ¶¶ 243–53). We provide a brief summary of Kronzer before turning to the parties' arguments and our analysis.

I. Kronzer (Ex. 1028)

Kronzer relates to an image-receptive heat transfer paper having at least one film layer comprised of a thermoplastic polymer. Ex. 1028, 1:7–8, Abstract. The image-receptive heat transfer paper has “an enhanced receptivity for images made by wax-based crayons, thermal ribbon printers, impact ribbon or dot-matrix printers, and the like.” *Id.* at 1:17–20. Kronzer's heat transfer paper includes a cellulosic nonwoven web base sheet and an image-receptive melt-transfer film layer having exposed surface. *Id.* at 4:44–46. The image-receptive melt-transfer film layer can be separated into a melt-transfer film layer and an image-receptive film layer. *Id.* at 4:53–54.

The base sheet “has sufficient strength for handling, coating, sheeting, and . . . for removal after transferring an image.” *Id.* at 4:67–5:3. “In preferred embodiments, the base sheet will be a latex-impregnated paper.” *Id.* at 5:6–7. The melt-transfer film layer overlaying the top surface of the base sheet melts in a range of from about 65° C to about 180° C. *Id.* at 4:5–8. The image-receptive melt-transfer film layer overlays the melt-transfer layer and includes “from about 15 to about 80 percent by weight of a binder and from about 85 to about 20 percent by weight of a powdered thermoplastic polymer.” *Id.* at 4:10–15. “[A]ny film-forming binder can be employed so long as it meets the criteria specified As a practical

matter, water-dispersible ethylene-acrylic acid copolymers have been found to be especially effective film-forming binders.” *Id.* at 6:24–31.

2. Claim 4

Claim 4 recites that “the third layer comprises at least one of a heat fusion reducing filler, a receptivity altering filler, an optical altering filler, or an adhesion altering filler.” Ex. 1012, 11:49–52. For this limitation, Petitioner contends that “Kronzer teaches a multi-layered image transfer sheet (e.g., image-receptive heat transfer paper) that includes a one or more layers that include other materials, such as processing aids, release agents, pigments, deglossing agents, antifoam agents, and the like.” Pet. 52 (citing Ex. 1028, 7:36–37). Petitioner reasons that “[i]n view of the similar materials taught by Akada and Kronzer [] for the hot-melt layer, it would have been obvious for the [person of ordinary skill in the art] to incorporate the ‘other materials’ as taught by Kronzer so as to arrive at dependent Claim 4 of the ‘475 Patent.” *Id.* at 53 (citing Ex. 1001 ¶¶ 243–253).

Patent Owner argues that Petitioner does not meet its burden as to claim 4 because “Petitioner does not point to which of these elements in Kronzer is a heat fusion reducing filler, which of these elements in Kronzer is a receptivity altering filler, which of these elements in Kronzer is an optical altering filler, or which of these elements in Kronzer is an adhesion altering filler.” Resp. 43 (citing Ex. 2020 ¶ 397).

We disagree with Patent Owner because Petitioner directs us to Kronzer’s disclosure of a melt-transfer layer including other materials, such as pigments. Pet. 52 (citing Ex. 1028, 7:36–37). We are persuaded that Kronzer’s disclosure teaches or suggests claim 4’s additional limitation at least because, as Dr. Scott credibly testifies, and Patent Owner does not

dispute, “‘pigments’ are ‘optical altering filler[s].’” Ex. 1001 ¶ 248; *see id.* ¶¶ 249, 252.

Therefore, Petitioner’s arguments and evidence demonstrate that Akada, Takao, and Kronzer teach or suggest all of the limitations recited in claim 4. We also agree with Petitioner’s un rebutted assertion that a person of ordinary skill in the art would have had reason to combine the teachings of Akada, Takao, and Kronzer, with a reasonable expectation of successfully arriving at the subject matter recited in claim 4. Pet. 43. As a result, we find that Petitioner establishes, by a preponderance of evidence, that claim 4 is unpatentable as obvious in view of Akada, Takao, and Kronzer.

F. Alleged Obviousness over Asajima and Kronzer (claim 16)

Petitioner contends that the subject matter of claim 16 would have been obvious over the combination of Asajima and Kronzer. Pet. 64. Petitioner directs us to portions of Asajima and Kronzer that purportedly disclose each of the limitations in the challenged claim. *Id.* at 53–54, 56–61, 64–65. Petitioner also relies on Dr. Scott’s testimony to support its arguments. *See id.* We provide a brief summary of Asajima before turning to the parties’ arguments and our analysis.

1. Asajima (Ex. 1018)

Asajima “relates to a thermal transfer image-receiving sheet and a process for producing the same.” Ex. 1018, 1:6–8. An object of Asajima’s invention “is to . . . provide a thermal transfer image-receiving sheet which enables a high-quality and high-density image free from dropout and omission to be formed with a good thermal energy efficiency even on a rough paper not having a smooth surface.” *Id.* at 2:8–14.

Asajima's first embodiment is depicted in Figure 1, which we reproduce below.

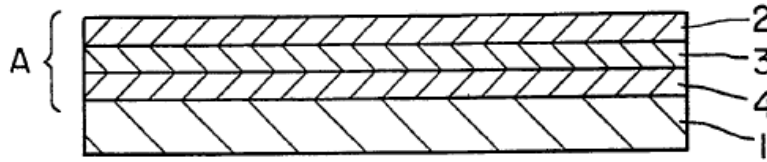


FIG. 1

Figure 1 “is a cross-sectional view of the thermal transfer image-receiving sheet according to the present invention.” *Id.* at 4:5–7. Figure 1 depicts a thermal transfer image-receiving sheet that includes “a resin layer A comprising at least dye-receiving layer 2 and including a hollow capsule having a volumetric hollowness of 50% or more . . . provided on a substrate sheet 1,” which “is not particularly limited” and may be, for example, “plain paper, wood free paper, tracing paper and plastic films.” *Id.* at 4:21–30. According to Asajima, “[t]he receiving layer 2 can be formed by coating one surface of the substrate sheet with a suitable organic solvent solution or organic solvent or water dispersion of a mixture of the above-described resin with necessary additives such as a release agent.” *Id.* at 5:16–20.

Asajima explains that resin layer A “may consist of the receiving layer alone” or, as shown in Figure 1, may further include “an intermediate layer or a barrier layer (hereinafter referred to simply as ‘intermediate layer 3’) and/or an adhesive layer or a pressure sensitive adhesive layer (hereinafter referred to simply as ‘adhesive layer 4’).” *Id.* at 4:35–43. “The intermediate layer 3 can be formed by coating a solution of a resin having a good film forming property” and “may comprise a resin having an improved strength.” *Id.* at 5:52–60.

Asajima further states that “[i]n the present invention, the incorporation of a filler, a white pigment, a fluorescent brightener, etc. in at least one of the above-described layers can provide a receiving layer having an excellent whiteness independently of the ground color of the transfer material.” *Id.* at 7:24–28.

2. Claim 16

Petitioner argues that the subject matter of claim 16 would have been obvious over the combination of Asajima and Kronzer. Pet. 64–65. Claim 16 depends from claim 13, which recites, in relevant part, “an opaque white layer overlaying a portion of the substrate member, the opaque white layer including a binder and a white or luminescent pigment.” Ex. 1012, 12:17–19. Petitioner argues that Asajima teaches this element because it describes an intermediate layer or adhesive layer, either of which may include white pigment. Pet. 58–59 (citing Ex. 1001 ¶¶ 356–358; Ex. 1018, 4:35–43, 7:41–62, 5:52–6:4, 9:60–62, 13:44–46, 17:61–63, 7:24–28); *see* Ex. 1018, Fig. 1 (elements 3, 4), 5:35–5:65, 6:9–24. Petitioner’s arguments are not persuasive.

In the Institution Decision, we initially determined that “Petitioner’s assertions as to Asajima’s teaching of an opaque white layer are conclusory, and insufficient.” DI 31. In its Reply, Petitioner does not address the deficiencies we identified in the Institution Decision or explain why its argument in the Petition shows that Asajima teaches the disputed limitation. *See* Reply 34–36. Accordingly, because claim 16 requires “an opaque white layer overlaying a portion of the substrate member, the opaque white layer including a binder and a white or luminescent pigment” and Petitioner does not establish that the combination of Asajima and Kronzer discloses or

suggests this limitation, Petitioner fails to show by a preponderance of the evidence that the subject matter of claim 16 would have been obvious over the combination of Asajima and Kronzer.

G. Alleged Obviousness over Akada, Takao, and Hare or Oez (claim 19)

Petitioner contends claim 19 would have been obvious in view of Akada as modified by Takao and either Hare or Oez. Pet. 54–56. Petitioner also relies on the declaration testimony of Dr. Scott to support its arguments. *See id.* We provide a brief summary of Hare and Oez before turning to the parties’ arguments and our analysis.

1. Hare (Ex. 1021)

Hare relates to “a method for applying an image to a receptor element [e.g., fabric] using two heating steps.” Ex. 1021, 1:11–12. Hare purports to improve the “adhesion and image quality of an image that has been transferred (e.g. imaged transfer) after it has been applied to a receptor element such as a fabric.” *Id.* at 2:45–48. Hare’s improvement is “achieved by re-ironing the already transferred image utilizing a material resistant to sticking (i.e. a tack resistant material such as silicone paper) between the hand-held iron and the transferred image on the receptor element.” *Id.* at 2:48–52. According to Hare, the silicone sheets are “used to protect coatings from [the] surface of [the] iron.” *Id.* at 9:53–55.

2. Oez (Ex. 1020)

Oez “relates to a transfer paper and to a process for transferring photocopies to textiles, such as, in particular, T-shirts.” Ex. 1020, 1:6–8. Oez describes “a transfer paper which has, as the coating of plastic, at least: a polyurethane which can be cross-linked under the action of heat by a melamine-formaldehyde resin esterified with methanol, mixed with an

acrylic acid ester/acrylic acid copolymer, the latter being a thickener.” *Id.* at 1:37–42. Oez states that “[i]t is furthermore of essential importance that a white pigment (TiO₂) can be incorporated into the mixture so that the prior white coating of dark (black) textiles hitherto necessary can now be dispensed with and the print can be transferred immediately with a single film.” *Id.* at 1:51–55.

Oez discloses that the coating “can be peeled off from the paper as a film and can be laid as a positive on the textile substrate to be ironed on and to bond with the textile fibers.” *Id.* at 1:47–49. Oez describes ironing the film onto a textile “at elevated temperatures.” *Id.* at 3:56–58.

3. Claim 19

Petitioner contends that the subject matter of independent claim 19 would have been obvious over the combination of Akada, Takao, and either Hare or Oez. *See* Pet. 54–56 (citing Ex. 1020, 3:10–13; Ex. 1021, 9:43–55; Ex. 1022, 5:4–6; Ex. 1001 ¶¶ 268, 306, 308–47). Patent Owner disagrees. Resp. 44–52.

In the Institution Decision, we determined that “Petitioner does not adequately establish that the combination of Akada, Takao, and Hare or Oez teaches the transfer of images to a dark-colored or black receiving member.” DI 29. In particular, we explained that “claim 19 . . . recites, among other elements, a ‘dark-colored or black receiving member,’” but “the Petition contains no analysis for this limitation.” *Id.* at 29–30 (citing Pet. 54–56; Ex. 1012, 12:56–58). Accordingly, we determined that “[g]iven Petitioner’s lack of analysis as to this limitation, we have substantial doubt that Petitioner demonstrates a reasonable likelihood of prevailing in its assertion

that the subject matter of claim 19 would have been obvious over Akada, Takao, and Hare or Oez.” *Id.* at 30.

Petitioner, in its Reply, does not persuasively address any of the deficiencies outlined above. *See, e.g.*, Reply 32–34. For example, Petitioner argues that “Dr. Scott opined that a [person of ordinary skill in the art] would understand that ‘dark-colored or black member[s]’ would be included in Akada’s broad description of objection on which its transfer sheet could be used.” *Id.* at 33 (citing Ex. 1001 ¶ 270). But the Petition does not cite to paragraph 270 of Dr. Scott’s declaration for the claim 19 analysis. *See* Pet. 54–56. And Petitioner does not dispute in the Reply that it failed to address in the Petition transferring an image to a dark-colored or black receiving member. Indeed, Petitioner’s Reply for these grounds does not even cite to the Petition.

Accordingly, because claim 19 requires “dark-colored or black receiving member,” and Petitioner does not establish adequately that its asserted prior art combinations disclose or suggest this limitation, Petitioner fails to show by a preponderance of the evidence that the subject matter of claim 19 would have been obvious over either the combination of Akada, Takao, and Hare, or the combination of Akada, Takao, and Oez.

H. Remaining Grounds

Having determined that Petitioner establishes by a preponderance of the evidence that the combination of Akada and Takao renders the subject matter of claims 1–3, 5–15, and 18 obvious, we need not address Petitioner’s additional grounds challenging these claims. *See SAS*, 138 S. Ct. at 1359 (holding a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Boston Sci. Scimed, Inc. v. Cook Grp. Inc.*,

809 F.App’x 984, 990 (Fed. Cir. 2020) (nonprecedential) (“We agree that the Board need not address [alternative grounds] that are not necessary to the resolution of the proceeding.”).

III. PETITIONER’S MOTION TO SEAL

Petitioner seeks to seal Exhibits 1050 and 1057 in their entirety. Paper 17, 1 (“Motion”). These exhibits include Ms. Schwendimann’s deposition testimony in the Delaware Lawsuit (Ex. 1050) and Ms. Schwendimann’s deposition testimony in the Arkwright Lawsuit (Ex. 1057). Motion 1–2. Petitioner asserts that these exhibits “should be sealed in their entirety because they were filed under seal in those cases.” *Id.* at 2. Petitioner’s Motion is unopposed. Petitioner represents that the parties “have agreed to the proposed Protective Order (Paper No. 25) in IPR2020-00635” and requests that “the [same] Protective Order govern the confidential materials in this Proceeding. *Id.* at 1.

There is a strong public policy in favor of making information filed in an *inter partes* review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. Under 35 U.S.C. § 316(a)(1) and 37 C.F.R. § 42.14, all papers filed in an *inter partes* review are open and available for access by the public. A party, however, may file a motion to seal confidential information, and the information is sealed pending the outcome of the motion. 37 C.F.R. § 42.54. As set forth in the Board’s CTPG, [t]he rules aim to strike a balance between the public’s interest in maintaining a complete and understandable file history and the parties’ interest in protecting truly sensitive information.” CTPG 19.

We have reviewed Exhibits 1050 and 1057 and we agree the documents may contain confidential information. Petitioner asks that the Board seal these exhibits in their entirety. But Petitioner, in its Petitioner Reply (Reply 8–9, 11, 20–21, 27), and both parties, during the *public* oral hearing (Tr. 4:15–21, 4:24–5:2, 16:4–10, 17:9–24, 24:12–14, 40:19–22, 43:22–23), discussed the contents of, and quoted from, these exhibits. We acknowledge Petitioner’s argument that the exhibits “should be sealed in their entirety because they were filed under seal in [the other] cases” (Motion 2), but that does not explain why we should seal each exhibit in its entirety. We further note that Petitioner has not provided publicly available, redacted versions of these exhibits. On balance, we find that the parties’ treatment of the confidential information fails to effectively balance the parties’ commercial and legal interests against the Board’s strong public policy that favors making information filed in *inter partes* review proceedings open to the public. For these reasons, we determine Petitioner does not show good cause for granting the Motion.

Accordingly, the Motion is denied without prejudice with regard to the sealing of Exhibits 1050 and 1057.

However, we authorize the parties to jointly file a revised motion to seal Exhibits 1050 and 1057, accompanied with redacted, public versions of these documents. Further, although the parties “have agreed” to the protective order the Board entered in IPR2020-00635, we entered that order in a separate proceeding involving a different record. In the interest of maintaining a complete record in this *inter partes* review, the parties are instructed to file a proposed protective order in this case, should they file a revised motion to seal.

IV. CONCLUSION¹⁴

After reviewing the complete record developed during the course of the trial, we conclude that Petitioner demonstrates, by a preponderance of the evidence, that claims 1–15 and 18 of the '475 patent are unpatentable. We further conclude that Petitioner does not demonstrate, by a preponderance of the evidence, that claims 16 and 19 of the '475 patent are unpatentable.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner establishes by a preponderance of the evidence that claims 1–15 and 18 of the '475 patent are unpatentable; and

FURTHER ORDERED that Petitioner does not establish, by a preponderance of evidence, that claims 16 and 19 of the '475 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Seal is denied without prejudice; and

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

¹⁴ 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).

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis¹⁵	Claim(s) Shown Unpatentable	Claim(s) Not Shown Unpatentable
1–3, 5–15, 18	103	Akada, Takao	1–3, 5–15, 18	
4	103	Akada, Takao, Kronzer	4	
15	103	Akada, Takao, Kronzer		
19	103	Akada, Takao, Hare		19
19	103	Akada, Takao, Oez		19
13–15, 18	102	Asajima		
15	103	Asajima, Kronzer		
16	103	Asajima, Kronzer		16
13, 18	103	Oez, Takao		
Overall Outcome			1–15, 18	16, 19

¹⁵ In view of our determination that the subject matter of claims 1–3, 5–15, and 18 would have been obvious over the combination of Akada and Takao, and that the subject matter of claim 4 would have been obvious over the combination of Akada, Takao, and Kronzer, we do not reach Petitioner’s additional grounds challenging these claims.

IPR2020-01122
Patent 7,766,475 B2

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