

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHENZHEN TUOZHU TECHNOLOGY CO., LTD.,

Petitioner

v.

STRATASYS, INC.

Patent Owner.

PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,592,660

Case No. IPR2025-00257

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LIST

Exhibit No.	Description
2001	Docket Navigator – Judge Rodney Gilstrap Motion Success for Stay Pending IPR and Time to Milestones
2002	United States District Courts — Judicial Caseload Profiles for Eastern District of Texas (Sept. 30, 2024 and Dec. 31, 2024), available at https://www.uscourts.gov/data-news/reports/statistical-reports/federal-court-management-statistics
2003	Minute Entry for proceedings held before District Judge Gilstrap on Nov. 7, 2024, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG (E.D. Tex. Nov. 14, 2024)
2004	Discovery Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 35 (E.D. Tex. Dec. 2, 2024)
2005	Protective Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 36 (E.D. Tex. Dec. 3, 2024)
2006	e-Discovery Order, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, Dkt No. 41 (E.D. Tex. Dec. 19, 2024)
2007	Invalidity and Ineligibility Contentions, <i>Stratasys, Inc. v. Shenzhen Tuozhu Technology Co. Ltd.</i> , No. 2:24-cv-00644-JRG, (E.D. Tex. Jan. 30, 2025)
2008	Transcript of Hearing on the Nomination of Howard Lutnick, of New York, to be Secretary of Commerce (Jan. 29, 2025)

I. INTRODUCTION

Pursuant to 35 U.S.C. § 313 and 37 C.F.R. § 42.107, Stratasys, Inc. (“Stratasys” or “Patent Owner”) hereby submits this Preliminary Response to the Petition for *inter partes* review (“Petition” or “Pet.”) filed by Shenzhen Tuozhu Technology Co., Ltd. (“Petitioner”), challenging claims 1–15 (“challenged claims”) of U.S. Patent No. 9,592,660 (“the ’660 Patent”) (EX1001).

Petitioner alleges that claims 1–15 are invalid based on five different grounds. First, Petitioner argues in Ground 1A that claims 1–13 and 15 are obvious over U.S. Patent Publication No. 2016/0075091 (“*Cable*”) (EX1006) in view of U.S. Patent Publication No. 2016/0096326 (“*Naware*”) (EX1007). Second, Petitioner argues in Ground 1B that claims 1–2, 4, 6–12, and 15 are obvious over *Cable* in view of U.S. Patent Publication No. 2006/0054039 (“*Kritchman*”) (EX1009). Third, Petitioner argues in Ground 1C that claims 7, 8, and 14 are obvious over *Cable* in view of *Naware* or *Kritchman* and U.S. Patent No. 9,744,730 (“*Comb*”) (EX1004). Fourth, Petitioner argues in Ground 2A that claims 1–3 and 5–15 are obvious over *Comb* in view of U.S. Patent Publication No. 2013/0310507 (“*Tummala*”) (EX1005). Fifth, Petitioner argues in Ground 2B that claims 1–15 are obvious over *Comb* in view of *Tummala* and *Kritchman*.

Petitioner has failed to meet its burden of showing a reasonable likelihood that it would prevail with respect to any of the challenged claims. As an initial

matter, the Board should exercise its discretion to deny institution under 35 U.S.C. § 314(a). Among other reasons articulated below, the parallel district court litigation will reach a final resolution in a jury trial before any final written decision in this forum.

On the merits, the Petition suffers from fatal defects in the asserted grounds, which provides an independent basis to deny institution. The challenged claims and the '660 Patent are directed to solutions that have a non-tape polymer coating attached to a thermally conductive plate surface that facilitates adhesion to a 3D object during printing and yet permits removal of the 3D object once formed and cooled in which the removal does not chemically or mechanically remove the polymer coating from the object or damage the coating, plate, or object.

Unlike the solutions disclosed in the challenged claims, the primary reference *Cable* in Grounds 1A-1C is silent as to how its substrate is made with a coating and fails to teach a non-tape polymer coating. Petitioner's reasons for using a non-tape coating with *Cable* are driven by impermissible hindsight and a flawed view of *Cable*'s teachings.

In addition, the claims of the '660 Patent were issued over the primary reference *Comb* in Grounds 2A-2B. Petitioner mischaracterizes the prosecution history of the '660 Patent and fails to address the examiner's conclusion that *Comb* fails to teach multiple claim elements related to the polymer coating, when

considered together. Grounds 2A and 2B also rely on the secondary reference *Tummala*, which teaches applying an adhesive at the start of each printing process and that part removal requires specific conditions, such as the use of a chemical solvent or raft, to use the adhesives it discloses. Petitioner's reasons for combining *Comb* and *Tummala* are flawed in view of *Tummala*'s teachings and the combination fares no better, which teaches solutions different than the claimed features of the '660 Patent.

Petitioner has failed to show that any of the challenged claims are reasonably likely to be found unpatentable as the Petition does not show at least one element of independent claim 1 is in the asserted references or combinations. The Board should not institute *inter partes* review of the '660 Patent for this reason alone, as described below.

In summary, there are two independent reasons for the Board to deny institution. The Board should exercise its discretionary power to deny institution under § 314, and the Board should not institute IPR in any event because each of Petitioner's grounds are deficient and thus Petitioner cannot satisfy its burden for obviousness.

II. THE *FINTIV* FACTORS FAVOR DENIAL OF THE PETITION

Institution of *inter partes* review is discretionary. 35 U.S.C. § 314 states that the "Director *may not* authorize an *inter partes* review to be instituted unless the

Director determines that the information presented in the petition . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (emphasis added¹). As the Supreme Court has explained, § 314(a) “invests the Director with discretion on the question *whether* to institute review.” *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 366 (2018). Pursuant to the Director’s discretion, the Board is “permitted, but never compelled, to institute an IPR proceeding.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016); *see also Cuozzo Speed Techs. v. Lee*, 579 U.S. 261, 273 (2016) (“the agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion”) (citing 35 U.S.C. § 314(a)). Irrespective of whether the minimum standards for institution are met, other reasons, such as “events in other proceedings related to the same patent,” may favor denying a petition. Consolidated Trial Practice Guide (84 Fed. Reg. 64,280 (Nov. 21, 2019)) (“Practice Guide”) at 58 (citing *NetApp, Inc. v. Realtime Data LLC*, IPR2017-01195, Paper 9, at 12–13 (PTAB Oct. 12, 2017) and explaining that the Board in *NetApp* denied institution under § 314(a) where “the Board likely would not have been able to rule on patentability until after the district court trial date”).

¹ Emphasis added throughout unless otherwise stated.

In determining whether to exercise its discretionary power under § 314(a), the Board balances a set of six factors, as articulated in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, at 6 (PTAB “Precedential” Mar. 20, 2020) (“*Fintiv* Precedent”). Here, each of the six *Fintiv* factors favors discretionary denial or is neutral. A co-pending litigation in the Eastern District of Texas (“Related Litigation”) involving both Petitioner and Patent Owner, substantially the same claims of the same patent, and invalidity challenges to the same patent (including the same prior art references as this Petition) will outpace a PTAB proceeding. The Petition fails to cite any credible reason why the “efficiency and integrity of the system” would not be “best served” by discretionary denial. *Fintiv* Precedent at 6.

A. Factor 1: Whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted

Factor 1 weighs in favor of discretionary denial. In the Related Litigation involving both Petitioner and Patent Owner, there has been no request for a stay pending *inter partes* review and the judge in the case, Judge Rodney Gilstrap, has not granted a stay.

Petitioner contends that this factor is neutral because there is purportedly “no evidence that, if the action is maintained and a stay is requested, the court will deny a stay.” Pet. at 82. However, Petitioner ignores the reality that it is highly unlikely that Judge Gilstrap will grant a stay in the Related Litigation pending IPR.

As an initial matter, Judge Gilstrap denies the vast majority of motions to stay pending IPR. Since 2019, over 85% of such motions were denied. EX2001 at 1.

In past decisions denying a stay pending IPR, Judge Gilstrap has made it clear that motions to stay will be denied if filed before the “last of the patents-in-suit to be acted upon by the PTAB.” Order Denying Motion to Stay Pending Inter Partes Review, *Acorn Semi, LLC v. Samsung Elecs. Co.*, No. 2:19-CV-00347-JRG, 2020 WL 10284981 at *2 (E.D. Tex. Sept. 14, 2020)). Similarly, Judge Gilstrap has denied motions to stay pending IPR when the IPR proceedings do not challenge every patent asserted in the case. *See, e.g., Uniloc USA, Inc. v. Motorola Mobility LLC*, 2:16-cv-00992-JRG, Dkt. No. 125 at 3 (E.D. Tex. Apr. 5, 2017) (denying a stay “given that the pending IPR petitions do not challenge every patent asserted in this case”).

Petitioner fails to provide any reason why the Court in the Related Litigation would depart from its practice of denying motions to stay filed before the last of the patents-in-suit are acted upon by the PTAB and before every one of the patents-in-suit are challenged in IPR. Indeed, Petitioner has overlooked the fact that the Related Litigation involves multiple patents besides the '660 Patent, which are either challenged in separate IPRs with different filing dates or have not been challenged in IPR. *See, e.g.,* EX1024 at 29 (listing four other asserted patents); IPR2025-00321, IPR2025-000532, IPR2025-00532 (related IPRs for three of the

other asserted patents). Thus, the reality is that Judge Gilstrap is highly unlikely to grant a stay in the particular Related Litigation due to facts specific to the case and parallel IPR proceedings.

A stay is also highly unlikely given that Petitioner has offered a very limited estoppel by stipulation that only covers “the same grounds of invalidity raised in th[e] petition.” EX1100. As Judge Gilstrap has explained, such a “limited estoppel,” as the one offered by Petitioner, increases its ability to “game the system,” “increase rather than reduce the complexity” of issues, and “devise an unfair second bite at the apple.” Memorandum and Order Denying Motion to Stay, *Intellectual Ventures II LLC v. Kemper Corp.*, No. 6:16-CV-0081-JRG, 2016 WL 7634422 at *3 (E.D. Tex. Nov. 7, 2016) (“The absence of a full statutory estoppel not only increases the ability of litigants to ‘game the system’ and devise an unfair second bite at the apple, it also has the potential to increase rather than reduce the complexity of the validity issues that may come before the Court.”). Petitioner has not agreed to be bound by the full “estoppel provisions of 35 U.S.C. § 315” (*id.* at 2) and thus any request for a stay in the Related Litigation will be denied. *See id.* at 2-3 (“This Court agrees with the last approach” in which “other courts have required that an accused infringer seeking to obtain the benefit of a stay should agree to be bound by the estoppel effect of 35 U.S.C. § 315(e).”).

Accordingly, factor 1 of the *Fintiv* analysis weighs in favor of discretionary denial because a stay in the related proceeding has not been requested and the evidence indicates that the Court in the Related Litigation will not grant a stay even if Petitioner were to request one.

B. Factor 2: Proximity of the court's trial date to the Board's projected statutory deadline for a final written decision

Given that trial in the Related Litigation is set to begin before any final written decision would be due, factor 2 favors discretionary denial. PTAB precedent makes clear that factor 2 favors discretionary denial “[i]f the court's trial date is earlier than the projected statutory deadline.” *Fintiv* Precedent at 9.

Here, the Court's trial date in the Related Litigation is earlier than the projected statutory deadline. The Court set a trial date for June 1, 2026. EX1101 at 1; EX3001. The projected statutory deadline for any final written decision is June 18, 2026. *See* Notice of Filing Date Accorded to Petition and Time for Filing Patent Owner Preliminary Response, Paper 3 (setting preliminary response date for March 18, 2025); 35 U.S.C. § 314(b) (setting expected decision whether to institute review for 3 months after a preliminary response); 35 U.S.C. § 316(a)(11) (requiring a final determination by 1 year after the decision whether to institute review, extendable by 6 months).

In general, the Court's trial date is consistent with both the U.S. court case statistics for the United States District Court for the Eastern District of Texas and statistics for patent cases before Judge Gilstrap, specifically. Since 2021, the median time from filing to trial for civil cases has varied between 19.0 and 23.0 months depending on the year and measurement period (e.g., by fiscal year or calendar year). *See* EX2002 at 1-2 ("From Filing to Trial (Civil Only)"). Applying these median timings to the present case, which was filed in August 2024 (*see* EX1024), trial would be expected between March 2026 and July 2026.

For patent cases before Judge Gilstrap, specifically, the median time from filing to trial is 21.7 months for cases filed since January 2008 (107 cases), 21.7 months for cases filed since January 1, 2019 (41 cases), and 23.2 months for cases filed since January 2022 (small sample size of 13 cases). EX2001 at 3, 5, 7.

Applying these median timings to the present case, trial would be expected between May 2026 and July 2026. Thus, the median time to trial statistics are consistent with the actual trial date the Court set for the Related Litigation, which is set for several weeks in advance of an expected final written decision deadline.

Petitioner asserts that this factor is neutral because any final written decision will be "nearly contemporaneous" with the trial date. However, Petitioner ignores numerous PTAB decisions that have weighed factor 2 somewhat in favor of discretionary denial when trial is expected to begin several weeks in advance of the

expected final written decision deadline. For example, the PTAB exercised discretionary denial in the *Apple Inc. v. Fintiv, Inc.* case in part because trial was scheduled to begin “approximately two months” before a final written decision. *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 15, at 12–13 (PTAB “Informative” May 13, 2020).

Other PTAB decisions have exercised discretionary denial with even shorter periods between a trial and final written decision. For instance, in *EClinicalWorks, LLC v. Decapolis LLC*, the PTAB denied institution where trial would begin “roughly one to two months before any final decision.” Decision Denying Institution of Inter Partes Review, *EClinicalWorks, LLC v. Decapolis LLC*, IPR2022-00229, Paper 10 at 9 (PTAB Apr. 13, 2022). In *EClinicalWorks*, the PTAB recognized that jury selection was set to begin approximately six weeks before a final written decision was expected and determined that factor 2 “weighs somewhat in favor of denial.” *Id.* (citing *Apple*, IPR2020-00019, Paper 15 at 13). Consistent with previous PTAB decisions, such as those in *Apple* and *EClinicalWorks*, finding that a trial date set shortly before any final written decision weighs somewhat in favor of denial, factor 2 of the *Fintiv* analysis in this proceeding weighs somewhat in favor of discretionary denial, because it is likely that the jury trial in the Related Litigation will occur several weeks before a final written decision would be due. *See also* Decision Denying Institution of Inter

Partes Review, *10X Genomics, Inc. v. President and Fellows of Harvard College*, IPR2023-01299, Paper 15 at 17 (PTAB Mar. 7, 2024) (finding factor 2 weighing in favor of discretionary denial where district court trial would occur at least one month before a final written decision would be due).

C. Factor 3: Investment in the parallel proceeding by the court and the parties

The proceedings of the Related Litigation are well underway and remain in progress. Petitioner asserts that “there has been little investment by the court and the Markman hearing is scheduled for December 3, 2025, well after institution.” Pet. at 82. However, Petitioner fails to address the efforts undertaken by the Court and parties thus far and will undertake before any decision on institution. Thus far, the Court has held a scheduling conference with the parties (EX2003) and entered numerous orders in the case, including a docket control order, discovery order, e-discovery order, and protective order. EX1101, EX2003, EX2004, EX2005, EX2006. In addition, the parties in the Related Litigation have (a) negotiated and proposed numerous orders, including the aforementioned orders, (b) exchanged initial disclosures (EX1101 at 6); (c) exchanged additional disclosures (EX1001 at 6); and (d) exchanged infringement, invalidity, and subject-matter eligibility contentions totaling well over 2,000 pages (*see* EX1101 at 5–6). Fact discovery is well underway with the parties having exchanged over 100 document requests,

exchanged requests and responses to over 30 interrogatories, and produced documents exceeding 44,000 pages, and third-party discovery. In addition, the parties have briefed issues related to party joinder. *Id.*

Besides these existing substantial investments in the Related Litigation, the parties will make further substantial investments in the Related Litigation before a decision whether to institute review is expected. Source code review and amended infringement contentions are anticipated based on the Court's local patent rules. *See* EX1101 at 5-6. Moreover, as explained above for factor 2, the parties and Court in the Related Litigation will make additional substantial investments by starting a jury trial prior to the expected final written decision deadline. Thus, any final written decision would simply revisit the jury's earlier findings regarding validity. Such duplicative efforts contradict the main purpose of *inter partes* review—to provide “quick and cost effective *alternatives* to litigation.” Practice Guide at 56 (quoting H.R. Rep. No. 112–98, pt. 1, at 40 (2011), 2011 U.S.C.C.A.N. 67, 69). Given the substantial investments made by the Court and parties, factor 3 weighs in favor of exercising discretionary denial.

D. Factor 4: Overlap between issues raised in the petition and in the parallel proceeding

The overlap in patent validity issues between the Petition and the Related Litigation is significant. There is significant overlap in claims with the vast

majority of claims (claims 1, 2, 4, 6-8, 10-12, and 14) involved in the Related Litigation. There is also significant overlap in invalidity references and grounds. As explained above, the Petition asserts five grounds involving various combinations of *Cable*, *Naware*, *Kritchman*, *Comb*, and *Tummala*. Each of these references is included in the Invalidity Contentions along with many others. *See* EX2007 at 157–60. Accordingly, there can be no dispute that all of the asserted grounds and references in this IPR are also at issue in the Related Litigation and that additional asserted grounds and references are at issue in the Related Litigation.

Petitioner asserts that this factor “favors institution as Petitioner has made a stipulation not to pursue the IPR grounds in District Court.” Pet. at 82. However, Petitioner ignores that it has offered a very limited stipulation that openly permits overlapping issues between the jury trial in the Related Litigation and a latter final written decision that it seeks from the Board. *See* EX1100. In doing so, Petitioner has failed to provide a stipulation not to pursue in a parallel proceeding the same grounds as in the Petition or any grounds that could have reasonably been raised in the Petition. *See Sand Revolution II, LLC v. Continental Intermodal Group*, IPR2019-01393, Paper 24 at 12 n.5 (PTAB “Informative” June 16, 2020); *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 19 (PTAB “Precedential” as to §II.A Dec. 1, 2020). As a result, Petitioner is not restrained

from asserting very similar obviousness theories in the Related Litigation that include only minor differences from the Grounds raised in this Petition.

Given this advantage, it appears that Petitioner has presented an opportunity for it to have two bites at the apple. As such, nothing prevents Petitioner from simply asserting the same reference or references repackaged in different permutations or a nearly identical theory challenging the claims of the '660 Patent with simple variations in a primary or secondary reference.

While Petitioner's stipulation can reduce a very limited set of overlapping issues, it wholly fails to eliminate most of the overlap between the Related Litigation and this proceeding. While similar, narrow stipulations have resulted in this factor weighing marginally in favor of not exercising discretionary denial (*see Sand Revolution II*, Paper 24 at 12), when factor 4 is considered with the other factors of the *Fintiv* analysis, discretionary denial is still favored.

E. Factor 5: Whether the petitioner and the defendant in the parallel proceeding are the same party

Petitioner is also a defendant in the Related Litigation, and Patent Owner is plaintiff in the Related Litigation. As the PTAB explained in *Apple*, factor 5 weighs in favor of discretionary denial where “the petitioner and the defendant in the parallel proceeding are the same party.” *Apple*, IPR2020-00019, Paper 15 at 15. Petitioner failed to address this factor in its Petition. *See* Pet. at 82. On its face,

Fintiv indicates that this factor should be considered. *See Fintiv* Precedent at 6.

Thus, factor 5 weighs in favor of exercising discretion to deny institution.

F. Factor 6: Other circumstances that impact the Board's exercise of discretion, including the merits

The sixth factor of the *Fintiv* analysis also favors discretionary denial.

Petitioner's sole argument for Factor 6 is premised upon pure speculation—the *prospect* of its Motion to Dismiss in the Related Litigation being granted. *See* Pet. at 82 (arguing that its “Motion to Dismiss further favors institution under Factor 6”). The Court in the Related Litigation has not ruled on the Motion to Dismiss, which is premised on the failure to join another party. *See* Defendant's Motion to Dismiss, *Stratasys, Inc. v. Shenzhen Tuozhu Technology Co., Ltd.*, Case No. 2:24-cv-00644-JRG, Dkt. No. 38 (E.D. Tex. Dec. 9, 2024). As Patent Owner explained in response to the Motion, the Motion fails to recognize “established principles,” including “as th[e] Court [in the Related Litigation] has repeatedly acknowledged, a plaintiff ‘is not required to accuse all infringers in the same action.’” *See* Plaintiff's Response to Defendant's Motion to Dismiss, *Stratasys, Inc. v. Shenzhen Tuozhu Technology Co., Ltd.*, Case No. 2:24-cv-00644-JRG, Dkt. No. 43 (E.D. Tex. Dec. 19, 2024) (internal citations omitted). As such, it is pure speculation whether the Court will grant the flawed Motion to Dismiss, much less whether the Court will do so before any decision on whether to institute review is due. Such

speculation should not receive any weight under factor 6 and cannot “tip the balance in favor of Petitioner.” *See Apple*, IPR2020-00019, Paper 15 at 17.

Although Petitioner fails to raise an argument regarding the merits of its Petition under factor 6, as explained in the section below, Petitioner's asserted grounds lack merits as they each have identified weaknesses. *See Apple*, IPR2020-00019, Paper 15 at 15–17 (finding that merits “do not tip the balance in favor of Petitioner and instead also weigh in favor discretionary denial in a balanced assessment of all the circumstances”).

Additionally, to the extent current or future directives from the Commerce Secretary, or his subordinates at the USPTO, instruct the Board to consider whether to exercise discretionary denial when a foreign company seeks to use the PTAB (a USPTO tribunal) to revisit the validity of a duly issued U.S. patent invented by an individual in the United States and owned by a U.S. company, Patent Owner seeks to preserve any argument under such directives. Testimony by the Secretary of Commerce indicates that his directive may be that foreign entities, such as the Petitioner, are not permitted to use the PTAB, a tribunal of the United States Patent and Trademark Office, to challenge the duly issued '660 Patent, that was invented by inventors in the United States and assigned to companies in the United States. *See EX2008 at 57; see also* Video of Hearing on the Nomination of Howard Lutnick, of New York, to be Secretary of Commerce (Jan. 29, 2025) at

1:56:15, available at https://www.commerce.senate.gov/2025/1/full-committee-nomination-hearing_2_3. Accordingly, Patent Owner preserves its argument under any such directive for the Board to consider whether to exercise discretionary denial when a foreign company seeks to use the PTAB (a USPTO tribunal) to revisit the validity of a duly issued U.S. patent invented by individuals in the United States and owned by a U.S. company when the foreign company will receive due process on the validity of the patent in the U.S. federal court system.

III. THE '660 PATENT AND THE CHALLENGED CLAIMS

A. Summary of the '660 Patent (EX1001)

The '660 Patent “generally relates to the field of 3D printing of objects.” EX1001 at 1:7–8. In particular, the patent is directed to “a temperature controlled build platform for three dimensional printing methods for high temperature thermoplastics.” *Id.* at 2:13–15.

The summary of the invention in the '660 Patent explains that the patent relates to:

- “provid[ing] a removable plate that is thermally conductive and is safely secured over the build platform allowing quick installation and release of the plate, and also allowing cooling of a 3D object separately while simultaneously allowing printing of a subsequent object” (*id.* at 2:16–21);
- “apply[ing] a high temperature polymer coating on the surface of the removable plate, secured over the heated build, providing tactility for improving adhesion between printable layers and the printing surface and maintain adhesion throughout the build” (*id.* at 2:22-27);

- “provid[ing] easy dissociation of the 3D object from the build platform without damaging the 3D object and/or tacky surface provided by the coating” (*id.* at 2:28-31);
- “provid[ing] an even surface of build platform by avoiding trapping of debris or air bubbles between the tacky coating or surface and the build platform” (2:32-35); and
- “reduc[ing] warping/bowing of the removable plate, where the thermal expansion of the plate can cause bowing and/or rippling, creating an uneven printing surface” (2:36-39).

According to the '660 Patent, printing methods that used “polyimide tape as a substrate on the build plate for 3D part adherence” or “ultem plates” (*id.* at 1:33-36) suffered from issues related to temperature, application, and removal. For example, such methods did not “meet the thermal requirements for high temperature thermoplastics” and “the adhesive for the polyimide tape can burn off under high temperatures releasing fumes and damaging the coating.” *Id.* at 1:34-36 and 1:54-56.

In addition, there were issues with the application and removal of polyimide tape. For example, the '660 Patent explains that “[a]pplying polyimide tape is a difficult process inevitably allowing for tiny debris or air to be trapped between the tape and metal surface. Once the metal surface is heated, the air gaps expand creating an uneven printing surface.” *Id.* at 1:51-54. The '660 Patent also explains that “tape can be easily damaged upon removal of the part” because “[a]t elevated temperatures, the bottom layer of tape can permanently adhere to the 3D part”

which causes tearing or the formation of bubbles. *Id.* at 1:57-64. Additionally, the user had to “wait for the build platform to cool” to reduce the risk of damage to the part and even after the plate cools, “the part may be difficult to remove without damaging the part and/or the polyimide tape.” *Id.* at 1:65-2:2.

The '660 Patent explains that a solution to these issues includes certain thermally conductive plates with a polymer coating. *See e.g., id.* at 2:3-8, 2:12-27. Solutions for a removable thermally conductive plate that is coated without a tape and facilitate adhesion during printing and removal are described in the Figure 1 embodiment of the '660 Patent. As shown below in Figure 1, the build apparatus (100) includes a build platform (102), a thermally conductive plate (104), and a high temperature polymer coating (106). *Id.* at 3:17-20.

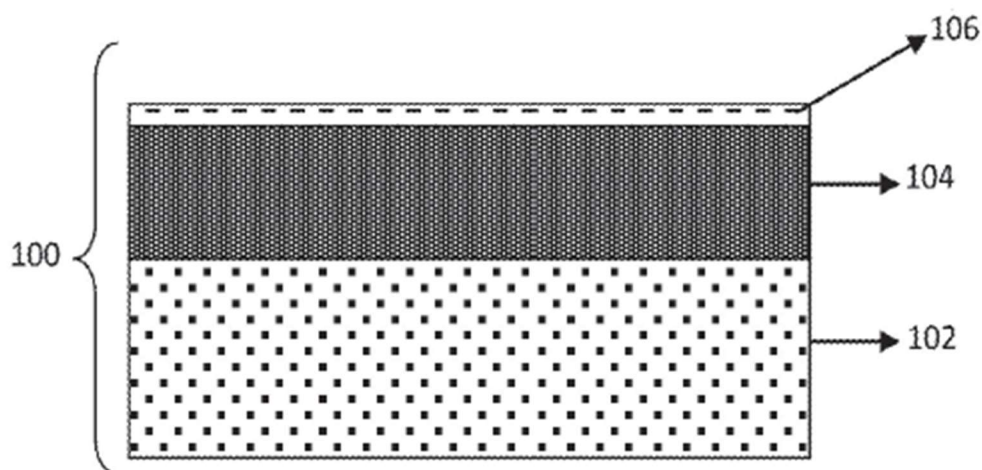


FIG. 1

Id. at FIG. 1. As the '660 Patent explains, the build platform 102 includes temperature control to evenly heat the surface of the platform. *See id.* at 1:20-29. The platform 102 can be a material such as “aluminum, steel, brass, ceramic, glass, or allows similar with low coefficient of thermal expansion (CTE).” *Id.* at 1:28-30.

The thermally conductive plate 104 “must be thermally conductive in nature” and “made of a material having a low coefficient of thermal expansion (CTE), to avoid expansion of the plate as it is heated up due to the heated build platform 102.” *Id.* at 1:55-63. The thickness of the plate 104 “depends on the flexural character of the material.” *Id.* at 4:1-3. It “must be thin enough to allow for minor flexing for part removal” and yet “must not be too thin such that heating of

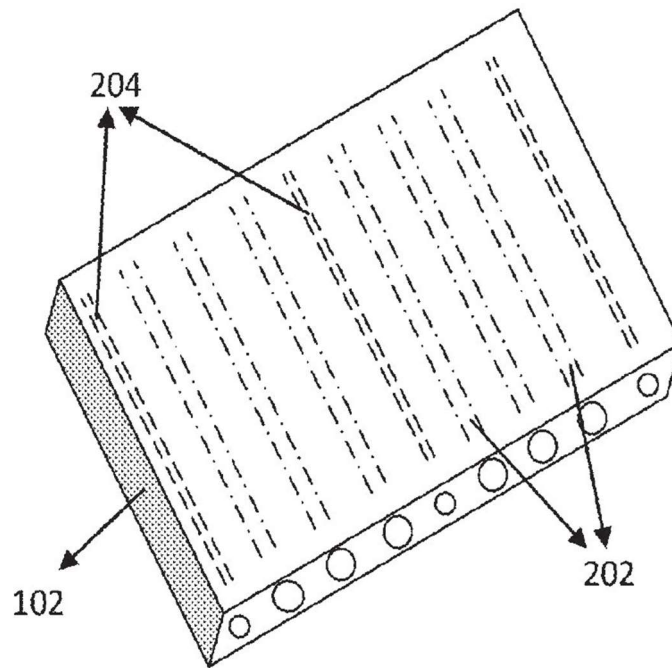
the plate produces rippling, bowing, or warping.” *Id.* at 4:3-7. Further, the plate 104 “must be able to withstand high temperatures.” *Id.* at 4:8-9.

In addition, the '660 Patent explains that the plate 104 is removable from the build platform 102. Such removability “allows for quick install and release of the plate.” *Id.* at 4:13-14. The plate is secured to the build platform to “prevent warping/bowing” due to “differences in thermal expansion and contraction compared to the build platform 102.” *Id.* at 4:14-18.

Further, the plate 104 is described as having “flexibility” to allow for “easier dissociation between the 3D object and the removable plate 104 upon cooling.” *Id.* at 5:5-8. The '660 Patent explains that “this flexibility also reduces the possibility of damage to the high temperature polymer coating 106 or the 3D object during object removal.” *Id.* at 5:9-11. Because “there is a significant difference in thermal contraction between the removable plate and the 3D printed polymer object,” the 3D printed polymer object “will pop off the plate 104 when the plate and part have cooled.” *Id.* at 5:15-20. For example, “a blade or wedge is no longer needed to pry off the object.” *Id.* at 5:11-12. As another example, the 3D object does not need “to be dug out from the platform” or removed “from a support raft requiring an additional step to dissolve or mechanically remove the support from the part.” *Id.* at 1:20-25.

The '660 Patent also describes the coating for the plate. For example, “the high temperature polymer used for coating may be polyimide.” *Id.* at 4:32-33. The coating provides a tacky surface for “preventing the extrudate (material extruded from the nozzle) from sliding along the plate 104 or sticking to extruding nozzle.” *Id.* at 4:44-47. Further, the coating “is resilient in nature and cannot be easily scratched or punctured” and its “surface toughness . . . prevents damage from occurring during 3D object removal.” *Id.* at 4:47-51; *see also Id.* at 4:61-64 (“temperature polymer 106, the surface of the high temperature polymer coating 106 may be roughened or treated”), 4:65-66 (“imparts a regular or an irregular patterned feature”), 4:66-5:4 (“may be roughened at the nano-, micro-, or millimeter scale”). In addition, the coating “does not wear away and thus does not need to be replaced after every build under high temperature.” *Id.* at 4:52-54.

The '660 Patent also describes a build platform with heating. For example, as shown in Figure 2 below, the build platform can include holes for heater cartridges and thermocouples. *Id.* at 3:32-34.



Id. at FIG. 2. The heater cartridges 202 can be spaced evenly along the surface of build platform 102. *Id.* at 3:34-46. In addition, thermocouples may be located at one or more locations 204 on the block 102 to “provide feedback to a controller, such as a PID controller, and hence maintain temperature set points throughout a build.” *Id.* at 3:48-42. In addition, a ceramic or other high temperature dielectric may be used to insulate and protect the build platform from heat. *Id.* at 3:42-44.

Numerous claims embody these solutions, including independent claim 1, which, among other things, recites:

- “a build platform with a temperature control unit;”
- “a thermally conductive plate disposed adjacent to the build platform;” and

- “a polymer coating attached to a surface of the thermally conductive plate which is capable of (i) facilitating adhesion to the 3D object during printing and (ii) permitting removal of the 3D object once the 3D object has been formed and cooled without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object, wherein the polymer coating is not a polymer tape.”

Id. at 6:35-47. Notably, the “polymer coating” must be “attached to a surface of the thermally conductive plate” and be capable of “facilitating adhesion to the 3D object during printing;” “permitting removal of the 3D object once the 3D object has been formed and cooled,” “without chemically or mechanically removing the polymer coating from 3D object,” and “without damaging the polymer coating, the thermally conductive plate, or the 3D object.” In addition, the polymer coating must not be “a polymer tape.” *Id.* As explained below, the asserted grounds fail to teach the elements of claim 1. Because claims 2–15 depend from claim 1, the asserted grounds also fail to teach the elements of dependent claims 2–15 for at least the same reasons.

B. Summary of the Prosecution History of the '660 Patent (EX1002)

During prosecution of the '660 Patent, the applicant amended the claims in response to an office action and explained that *Comb*—one of the primary references in this Petition—does not teach or disclose “a build platform with a temperature control unit for regulating a temperature of the build platform” and “a polymer coating adjacent to a surface of the thermally conductive plate for maintaining adhesion between the 3D object and the build surface throughout the printing, which polymer coating has a surface that (i) facilitates adhesion to the 3D object during printing and (ii) permits removal of the 3D object once the 3D object has been formed and cooled by the temperature control unit, wherein the temperature control unit cools the 3D object subsequent to formation, to permit removal of the 3D object from the thermally conductive plate without removal of the thermally conductive plate from the build platform.” EX1002 at 84, 77 (Oct. 7, 2016 Response to Final Office Action).

Thereafter, the examiner initiated an interview with the applicant during which the participants discussed two other references in the record: U.S. Patent Publication 2005/0058837 to *Farnworth* and U.S. Patent Publication 2013/0297320 to *Buser*. EX1002 at 51. Notably, the summary indicates that the participants in the interview did not discuss *Comb*, the reference at issue in this Petition. *See id.* Rather, the summary indicates that the participants discussed new

matter, *Farnworth*, and *Buser*, as well as the examiner's proposed amendments, which the participants agreed would place the application in condition for allowance. *See id.*

After the interview, the examiner entered an amendment to the claims that were previously amended by the applicant. EX1002 at 46. Notably, the Examiner's amendment kept many of the claim elements amended previously by the applicant, including a polymer coating for "a surface of the thermally conductive plate" that facilitates "adhesion to the 3D object during printing" and that permits "removal of the 3D object once the 3D object has been formed and cooled." EX1002 at 46; *see also* EX1002 at 77. The examiner's amendment also clarified that removal of the 3D object does not require "chemically or mechanically removing the polymer coating" and can be achieved "without damaging" the plate, object, or a polymer coating that is not a polymer tape. EX1002 at 46. As the examiner explains, none of the cited art—*Comb*, *Farnworth*, or *Buser*—taught the combination of elements required by the claim, including a polymer coating that is not a polymer tape, that is attached to a surface of the thermally conductive plate, and is capable of facilitating adhesion of the 3D object during printing and permitting removal of the 3D object once the 3D object has been formed, without chemically or mechanically removing the coating and without damaging the coating, plate, or object. *See* EX1002 at 49. Contrary to Petitioner's mischaracterization that focuses solely on

the polymer coating not being a polymer tape (*see* Pet. at 4), the examiner recognized that the claimed solution solved at least three critical issues in the current art, including the difficulty with removal the 3D object, without a chemical/mechanical means, and preventing damage. EX1002 at 49. For these *collective* reasons, the examiner allowed the claims of the '660 Patent.

In addition to Petitioner's mischaracterization of the prosecution history for the '660 Patent, Petitioner mischaracterizes the prosecution history of the continuation application, U.S. Application No. 15/422,303. According to Petitioner, the "proposed independent claim 19 of the '303 application is similar to independent claim 1 of the '660 patent, but largely narrower" and that the "only non-overlapping limitation" is the polymer coating that is not a polymer tape. Pet. at 5–7. Petitioner's flawed view fails to consider that the proposed independent claim 19 of the continuation application was also broader than claim 1 of the '660 Patent. A simple comparison between the two claims indicates there are numerous differences indicating that the claim in the continuation application was broader than claim 1 of the '660 Patent in many ways:

- claim 1 of the '660 Patent recites a "3D object of thermoplastics" whereas the continuation claim recites any "three-dimensional (3D) object;"

- claim 1 of the '660 Patent recites a polymer coating that is “*attached* to a surface of the thermally conductive plate” whereas the continuation claims recites a coating “*adjacent to* [the] thermally conductive plate;”
- claim 1 of the '660 Patent recites a coating capable of “facilitating adhesion to the 3D object during printing” whereas the coating of the continuation claim is configured to “secure at least a portion of said 3D object during printing;”
- claim 1 of the '660 Patent recites “permitting removal of the 3D object once the 3D object has been formed and *cooled*” whereas the continuation claim is silent as to cooling of the 3D object specifically; and
- claim 1 of the '660 Patent recites “without damaging *the polymer coating*, the thermally conductive plate, or the 3D object” whereas the continuation claim only requires “without damaging said thermally conductive plate or said 3D object.”

By ignoring these numerous differences between the claims, which indicate that the continuation claim was also broader than claim 1 of the '660 Patent, Petitioner has mischaracterized the prosecution history of the continuation application to support its flawed conclusion about the patentability of the '660

Patent. As explained below, the examiner was correct about *Comb*, which like to *Cable*, does not teach all elements of claim 1 of the '660 Patent in the asserted grounds.

IV. LEVEL OF ORDINARY SKILL

For the purpose of this Preliminary Response, Patent Owner does not contest Petitioner's description of a person of ordinary skill in the art (a "POSITA") having a bachelor's degree in Mechanical Engineering, Chemical Engineering, Materials Science, or a comparable field and at least two years of experience related to 3D printing, with additional experience potentially being a substitute for a formal degree or training (and vice versa).

As explained below, the Petition has failed to show that the claims of the '660 Patent are unpatentable irrespective of the level of skill of a skilled artisan.

V. CLAIM CONSTRUCTION

For the purposes of this Preliminary Response, Patent Owner submits that the Board does not need to construe any claim terms in any particular way to conclude that the Petition is deficient and thus institution of review is not warranted. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) ("need only be construed 'to the extent necessary to resolve the controversy'").

VI. APPLICABLE LEGAL STANDARDS

As explained above, institution of *inter partes* review is discretionary under 35 U.S.C. § 314. At a minimum, Petitioner must show there is a reasonable likelihood of prevailing with respect to at least 1 challenged claim. *See* 35 U.S.C. § 314(a); 37 C.F.R. § 42.108(c); Practice Guide at 3 (“The Board, acting on behalf of the Director, may institute a trial where the petitioner establishes that the standards for instituting the requested trial are met”)

Each of Petitioner's grounds relies on obviousness under 35 U.S.C. § 103. A claim cannot be considered obvious if even one element of the claim is absent from the prior art. *See CFMT, Inc. v. YieldUp Int'l Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (“Obviousness requires a suggestion of all limitations in a claim.”) (citing *In re Royka*, 490 F.2d 981, 985 (C.C.P.A. 1974)); *In re Rijckaert*, 9 F.3d 1531, 1534 (Fed. Cir. 1993) (reversing obviousness rejection as not all claim elements were taught or suggested); *Garmin Int'l, Inc. v. Patent of Cuozzo Speed Techs. LLC*, IPR2012-00001, Paper 15 at 15 (PTAB Jan. 9, 2013) (denying institution of IPR in part as prior art did not disclose all claim limitations in obviousness challenge).

Obviousness is resolved based on several factual determinations including the scope and content of the prior art, any differences between the claimed subject matter and the prior art, and the level of ordinary skill in the art. *See Graham v.*

John Deere Co., 383 U.S. 1, 17-18 (1966). IPR petitions “must address the *Graham* factors.” *Eizo Corp. v. Barco N.V.*, IPR2014-00358, Paper 11 at 29-30 (PTAB July 23, 2014) (citing *Graham*, 383 U.S. at 17-18) (faulting Petitioner for its failure to identify differences between the claimed subject matter and the prior art and its conclusory assertions about the teachings of the prior art); *see also Moses Lake Indus., Inc. v. Enthone, Inc.*, IPR2014-00243, Paper 6 at 18 (PTAB June 18, 2014); *Moses Lake Indus., Inc. v. Enthone, Inc.*, IPR2014-00246, Paper 6 at 17 (PTAB June 18, 2014); *eBay, Inc. v. Paid, Inc.*, No. CBM2014-00125, Paper 15 at 21 (PTAB Sept. 30, 2014).

The conclusion of obviousness based on the combination of references must be supported by an explicit analysis of a reason to combine such references. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). Mere conclusory statements are insufficient. Instead, “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006); *see also LG Elecs., Inc. v. Cellular Commc’ns Equip. LLC*, IPR2016-00197, Paper 7 at 7-11 (PTAB Apr. 29, 2016) (petition’s conclusion of obviousness lacked sufficient articulated reasons with rational underpinnings for modifying references to achieve specific elements of the claims).

VII. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 1A

A. Overview of *Cable* (EX1006)

Cable is directed to additive manufacturing object removal. EX1006 at Title, Abstract. Figure 3 of *Cable* illustrates an additive manufacturing object. *Id.* at ¶[0057].

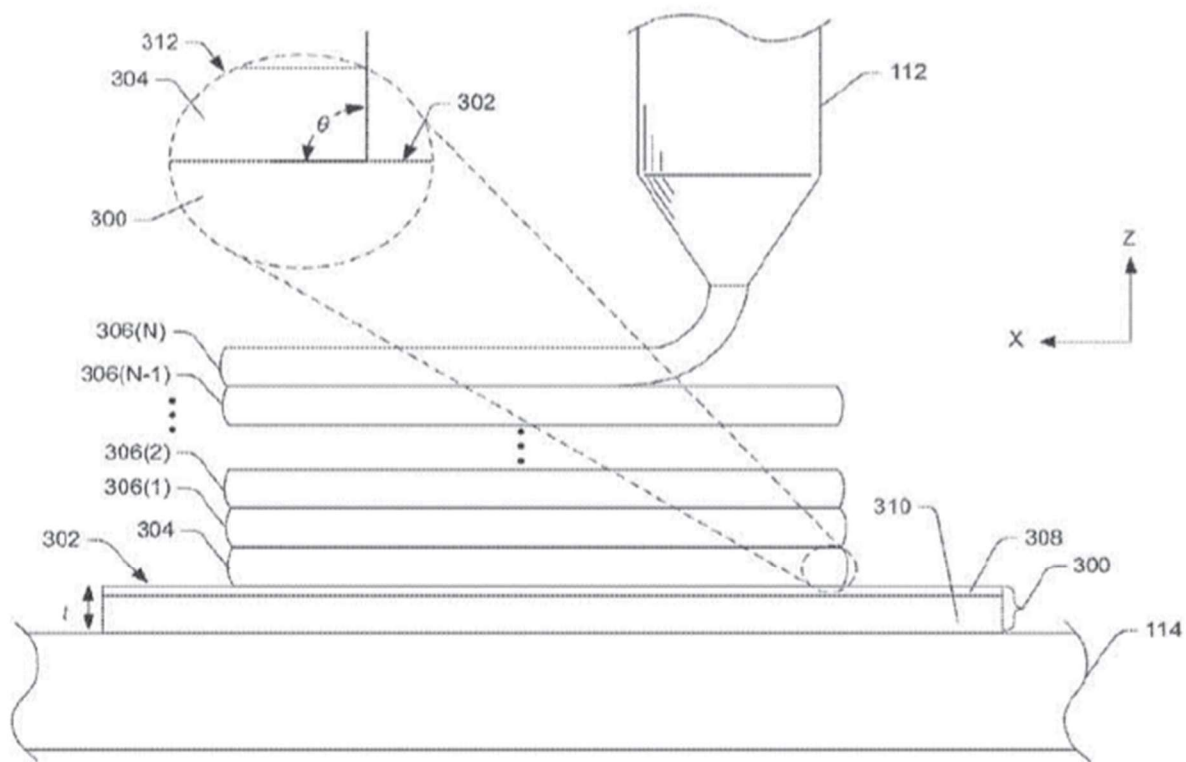


Fig. 3

Id. at FIG. 3. Substrate 300 includes top layer 308 and main portion 310. *Id.* at ¶[0061]. *Cable* explains that substrate 300 “can be manufactured by coating a main portion 310 . . . to form the top layer 308” but is silent as to how the coating is applied. *See id.*

B. Overview of *Naware* (EX1007)

Naware discloses a selective zone temperature control build plate that “includes multiple elements which have contact plates and temperature control modules.” EX1007 at Abstract.

Figure 2 of *Naware* shows a view of the build plate.

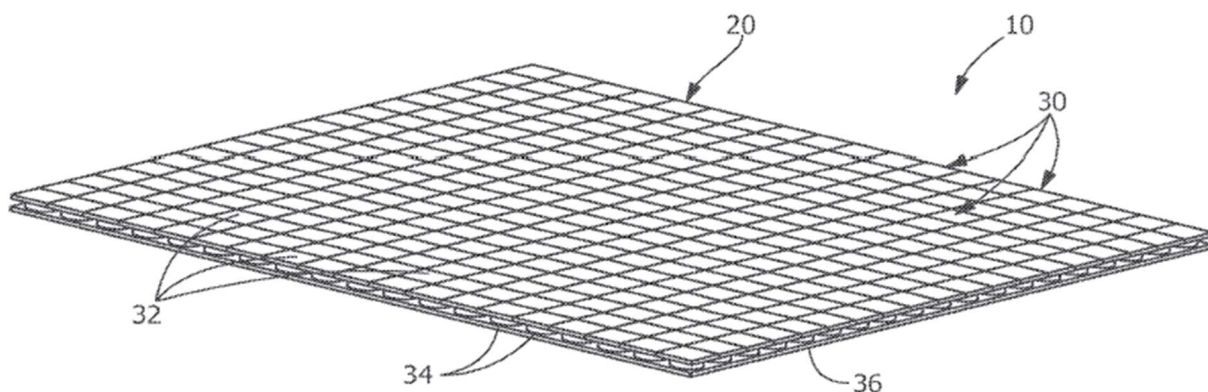


FIG. 2

Id. at FIG. 2. Build plate 10 has modular elements 30 that each include contact plate 32, temperature control module 34, and insulating plate 36. *Id.* at ¶[0031]. Multiple contact plates 32 form an upper surface 20. *Id.*

C. Ground 1A does not teach or suggest a polymeric coating that is not tape

Ground 1A involves the combination of *Cable* and *Naware*. Pet. at 8.

Among other things, claim 1 of the '660 Patent requires “a polymer coating attached to a surface of the thermally conductive plate” “wherein the polymer coating is not a polymer tape.” EX1001 at 6:39-47.

Contrary to Petitioner's assertions (Pet. at 21-22, 25-26), the combination does not disclose these elements of claim 1. *Cable* discloses a substrate that is "manufactured by coating a main portion or body" with a polymer. EX1006 at ¶¶ [0061], [0036] (substrate "can include a coating of the polymeric material"). However, there is no express disclosure or teaching in *Cable* that the polymeric coating is not tape. As the background of the '660 Patent explains, manufacturing methods for substrates used "polyimide tape." See, e.g., EX1001 at 1:33-36; *supra* Section III.A. As the Federal Circuit has explained, silence in a reference cannot support a finding of unpatentability. *Int'l Bus. Machines Corp. v. Iancu*, 759 F. App'x 1002, 1011 (Fed. Cir. 2019) ("[E]ven if the Board were correct that [the reference] is 'silent' about the content of the accessCard, that characterization would not alone support a finding that there was no user authentication action in this scenario if, as appears, the Board meant that it simply could not tell one way or the other whether the accessCard contains credentials."). In *Int'l Bus. Machines*, the Court explained that silence in the reference "would not alone support a finding that there was no user authentication action." *Id.* Additionally, the Court explained that a Petitioner's burden cannot "be met merely by adding a finding that [Patent Owner] did not prove the opposite." *Id.* Because *Cable* is silent as to how the substrate is made with a polymer coating, *Cable*'s silence is insufficient to support Petitioner's obviousness theory in Ground 1A.

Cable's silence is echoed by Petitioner, which fails to adequately explain why it would be obvious to use a polymer coating that is not tape that is attached to a surface of the thermally conductive plate, and is capable of facilitating adhesion of the 3D object during printing and permitting removal of the 3D object once the 3D object has been formed, without chemically or mechanically removing the coating and without damaging the coating, plate, or object. The first reason supplied by the Petition relies on impermissible hindsight. Namely, the Petition's claim that "the difficulties/drawbacks of polymer tapes like Kapton tape were well documented" largely relies on the disclosure of the '660 Patent itself. Pet. at 26 (citing EX1001, 1:31-64, 4:35-38). As the Federal Circuit has explained, it is hindsight to use "the invention to define the problem the invention solves" because "when someone is presented with the identical problem and told to make the patented invention, it often becomes virtually certain that the artisan will succeed in making the invention." *Mintz v. Dietz & Watson, Inc.*, 679 F.3d 1372, 1377 (Fed. Cir. 2012); *see also AT&T Services Inc. et. Al. v. Innovative Sonic Ltd.*, IPR2024-001143 (PTAB Feb. 11, 2025) (denying institution after finding no motivation to combine because of an overly broad conclusion that "suffers from hindsight bias"). Although Petitioner also relies on its expert, Petitioner fails to cite any corroborating evidence to support its conclusion. *See* Pet. at 26 (citing EX1003, ¶¶96, ¶¶40–43 but failing to provide any corroborating evidence).

Accordingly, Petitioner's argument with respect to the problem the invention solves is also subject to impermissible hindsight. *See Mintz*, 679 F.3d at 1377.

The Petition's second reason—*Cable* does not compel the tape solution that claim 1 forbids and non-tape solutions would have been considered—is also flawed. *See Pet.* at 26. *Cable* merely states that the substrate can have “any suitable laminar arrangement”—the reference is silent as to how the substrate is made with a coating and whether the coating is a non-tape polymer. *See EX1006*, ¶[0078]. Indeed, the very same paragraph in *Cable* provides the suitability metrics that fail to address the issues with using certain tapes. For instance, *Cable* requires the substrate to “flex or bend resiliently for enabling removal of the object” and the top layer to be a material “to create optimal adhesion characteristics at the interface” between the first layer of the build material and the surface of the substrate. *See id.* Even if impermissible hindsight were used, these suitability metrics in *Cable* do not align with the concerns disclosed by the '660 Patent. For example, the '660 Patent discloses that polyimide tape creates “an uneven printing surface,” the tape can “burn off under high temperatures releasing fumes and damaging the coating,” and that “a user has to wait for the build platform to cool to reduce the risk of damage to the part during removal.” *EX1001*, 1:51-67. None of these concerns about polyimide tape relate to flex/bend resiliently or adhesion goals of *Cable*. Thus, *Cable* fails to even suggest a substrate made with a non-tape polymer.

Further, to the extent Petitioner relies on alleged knowledge of a POSITA or common sense to supply this claim element, resorting to common sense or a POSITA's knowledge alone is improper. *See Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016) (“common sense is typically invoked to provide a known motivation to combine, not to supply a missing claim limitation”). As the Federal Circuit explained in *Arendi*, the Court's cases “repeatedly warn that references to ‘common sense’—whether to supply a motivation to combine or a missing limitation—cannot be used as a wholesale substitute for reasoned analysis and evidentiary support, especially when dealing with a limitation missing from the prior art references specified.” *Id.* at 1362. In the rare case where common sense “is used to supply a missing limitation” the search for “a reasoned basis for resort[ing] to common sense must be searching” and “this is particularly true where the missing limitation goes to the heart of an invention.” *Id.* Relying on the knowledge of a POSITA or common sense to supply this claim element would be improper where it is admittedly missing from *Cable* in the asserted combination.

Accordingly, the combination in Ground 1A fails to provide all the elements of claim 1 and its dependent claims.

VIII. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUNDS 1B AND 1C

Ground 1B involves the combination of *Cable* and *Kritchman* and Ground 1C involves the combination of *Cable*, *Naware* or *Kritchman*, and *Comb. Pet.* at 37, 43. Petitioner mainly relies on *Cable* to address the limitations of claim 1 in Ground 1B. In particular, Petitioner only relies on *Kritchman* in Ground 1B for its purported teaching of integrating a temperature control unit within a build platform. *See id.* at 41-42. For the other elements of claim 1, Petitioner relies on the same rationales as in Ground 1A. *See id.* at 41, 43-45. Accordingly, Ground 1B fails to teach all elements of claim 1 and its dependent claims for at least the reasons discussed above for Ground 1A. Further, unlike Grounds 1A and 1B, Ground 1C only addresses dependent claims of the '660 Patent (i.e., claims 7-8, 14), and thus Ground 1C at least has the defects as discussed above with respect to Ground 1A.

IX. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 2A**A. Overview of *Comb* (EX1004)**

Comb is directed to a solution with a magnetic platen assembly for an additive manufacturing system. *See* EX1004, at Title, Abstract, 1:65-2:13. The assembly can include “a chuck portion and a plurality of build sheets.” *Id.* at 2:14-17; *see also id.* at 2:17-30. A first build sheet can be used for printing and then

removed before a second build sheet is placed on the platen plate. *See id.* at 2:31-47.

As discussed above, *Comb* was considered by the examiner during prosecution of the '660 Patent. *Supra* Section III.B. Figure 5 of *Comb* shows the build sheet removed from a chuck portion of the platen assembly.

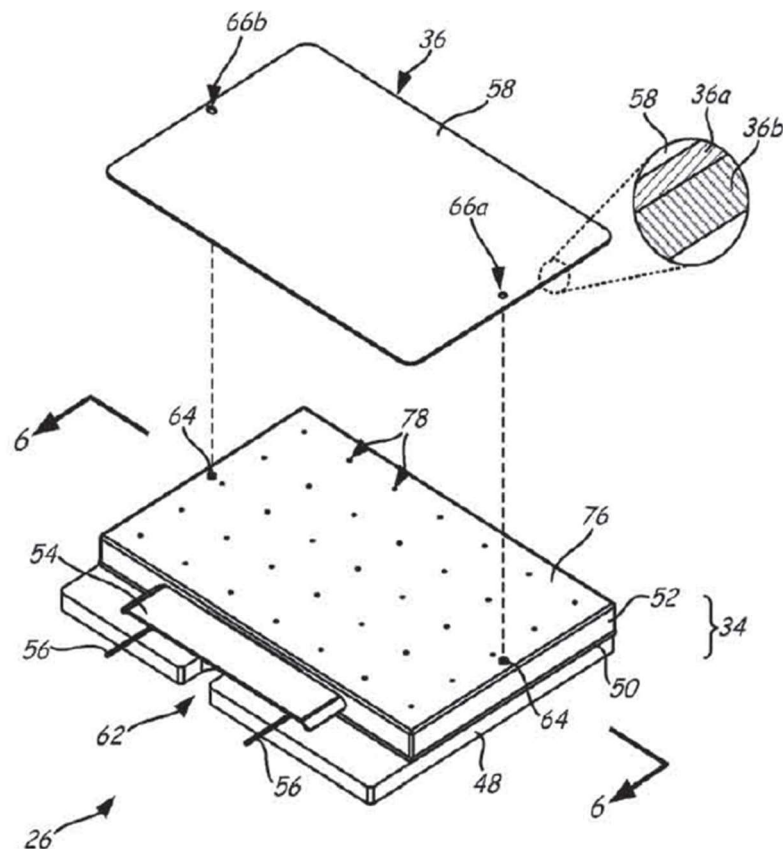


FIG. 5

EX1004 at FIG. 5. Build sheet 36 has a top film 36a and base sheet 36b. *Id.* at 8:20-26. Although *Comb* describes “polymeric coatings, tapes, or other lamina” generally,

Comb explains that “[f]or use with higher-temperature part materials” specifically, “top film 36a may be applied to base sheet 36b as a high-temperature tape” such as KAPTON tape. *Id.* at 8:34-39; *see also id.* at 8:27-33. *Comb* explains that a prior-used film may be removed from sheet and a new film may be applied to allow re-use of the previous sheet or residual printed layers must be removed from the prior-used film. *Id.* at 13:6-16.

B. Overview of Tummala (EX1005)

Tummala is directed to an adhesive for 3D printing. EX1005 at Title.

Tummala describes that its adhesive is “applied to a print pad prior to the beginning of a printing process.” *Id.* at ¶[0023]. Accordingly, *Tummala*’s method for printing a 3D article requires first “applying an adhesive,” such as a gel, “to a build surface of a print pad. *Id.* at ¶[0063]; *see also id.* at ¶[0053]. While the adhesive needs to be applied for each method, *Tummala* teaches that the print pad itself is reuseable. *Id.* at ¶[0006]. *Tummala* also describes the components of its adhesives, which can include a first polymeric component (*id.* at ¶[0028]), second polymeric component (*id.* at ¶¶[0030]-[0033]), solvent (*id.* at ¶¶[0036]-[0037]), surfactant (*id.* at ¶¶ [0038]-[0040]), and preservative (*id.* at ¶¶[0041]-[0042]).

As shown below in Table 1, *Tummala* tested the adhesion or bonding strength of its adhesives.

TABLE I

Footprint	Raft	Print Pad	100° C. (Dry)	23° C. (Dry)	23° C. (Wet)
2 × 2	raft	anodized aluminum	>20 lbs	0-0.5 lbs	0-0.5 lbs
2 × 2	no raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
2 × 2	no raft	Course Grind textured glass	—	>20 lbs	0-0.5 lbs
3 × 3	raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
3 × 3	no raft	anodized aluminum	>20 lbs	19 lbs	0-0.5 lbs

Id. at ¶[0046]. *Tummala*'s test results show two different footprints (2x2 and 3x3), two different supports (raft and no raft), two different print pads (anodized aluminum or course grind textured glass), and the bonding strength at three different conditions (100°C (Dry), 23°C (Dry), and 23°C (Wet)). *See id.* To achieve a low bonding strength (0-0.5 lbs) for printed part removal, *Tummala*'s test results indicate that a raft or wet condition is required.

C. Ground 2A does not teach or suggest a polymeric coating that is not tape for use in printing a 3D object of thermoplastics that enables removal without chemically or mechanically removing the polymer coating from the 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object

Ground 2A involves the combination of *Comb* and *Tummala*. Pet. at 46.

Among other things, claim 1 of the '660 Patent requires "a polymer coating attached to a surface of the thermally conductive plate." EX1001 at 6:39-47. The polymer coating must be capable of "(i) facilitating adhesion to the 3D object during printing" and "(ii) permitting removal of the 3D object once the 3D object

has been formed and cooled without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object.” *Id.* In addition, the “polymer coating is not a polymer tape.” *Id.*

Contrary to Petitioner's assertions in the Petition (Pet. at 60-69), the combination does not disclose these elements of claim 1. The Petition mainly relies on *Comb* (see Pet. at 61-68, 69) and asserts *Comb* teaches that “top film 36a may be derived from one or more polymeric coatings, tapes, or other lamina” and “top film 36a, as an adhesive tape or other coating.” See, e.g., Pet. at 68-69. In support of its assertions, Petitioner argues that the examiner was wrong in concluding that the claims were patentable over *Comb* during prosecution. See Pet. at 7.

However, Petitioner mischaracterizes the prosecution history to support its flawed conclusion about *Comb*. As explained above, the examiner provided many reasons why the claims were allowable over *Comb* and the other cited art. *Supra* Section III.B. Among other things, the examiner found that *Comb* fails to teach or suggest the claim elements related to the polymer coating. Namely, “a polymer coating that is not a polymer tape attached to a surface of the thermally conductive plate capable of (i) facilitating adhesion to the 3D object during printing and (ii) permitting removal of the 3D object once the 3D object has been formed and without chemically or mechanically removing the polymer coating from 3D object

and without damaging the polymer coating, the thermally conductive plate, or the 3D object.” EX1002 at 49. Consistent with the examiner’s conclusion, *Comb* fails to teach a polymer coating that is not a polymer tape that is capable of facilitating adhesion and permitting removal as claimed. Petitioner fails to directly address the examiner’s statements in the notice of allowance, and instead misconstrues the examiner’s statements as limited to a non-tape polymer. *See* Pet. at 7. Accordingly, there is no reason to revisit the examiner’s conclusion that *Comb* does not teach these elements of claim 1. Indeed, the only example in *Comb* of a coating for higher-temperature part materials is a high-temperature tape for top film 36a, which was acknowledged by the ’660 Patent. *See* EX1004, 8:27-39; *see also supra* Section III.A.

Recognizing some of these deficiencies of *Comb*’s teachings, Petitioner relies on *Tummala* to supply a motivation to select a non-tape adhesive to “apply *Comb*’s polymer as a gel,” or to apply *Tummala*’s polymer as a gel in place of *Comb*’s material. Pet. at 49-50. Petitioner argues that *Tummala* teaches the claimed polymer coating because it purportedly discloses a polymer coating applied as a gel that obviates the need “to remove all of the extruded print material or support material of a previous print process prior to beginning a new print process” and

enables use of reuseable print pads. *Id.* at 64-69 (citing EX1005², ¶¶[0007]-[0008], [0045]).

However, Petitioner's arguments fail to address all elements of claim 1 under the combined teachings of *Comb* and *Tummala*. In particular, Petitioner does not specifically address how *Tummala*'s teaching of a polymer coating (or motivation to select a non-tape coating) enables removal without chemically or mechanically removing the polymer coating and without damaging the polymer coating, the thermally conductive plate, or the 3D object. To the extent Petitioner relies on inherency, the Petition does not discuss how *Tummala*'s teachings in the combination would *necessarily result* in these claim elements. *See* Pet. at 64-69 (citing EX1003, ¶¶198-208 and Exhibits 1001, 1004, and 1005); *see also PAR Pharm., Inc. v. TWI Pharm., Inc.*, 773 F.3d 1186, 1195 (Fed. Cir. 2014) ("Inherency . . . may not be established by probabilities or possibilities."); *see also Personal Web Techs., LLC v. Apple, Inc.*, 917 F.3d 1376 (Fed. Cir. 2019) (resorting to inherency in obviousness analysis is improper where the claimed element does not necessarily exist in the prior art); *Intel Corp. v. VLSI Tech. LLC*, IPR2018-01296, Paper 15 at 14-16 (PTAB Apr. 11, 2019) (declining to institute review because petition failed to show that the claimed element is "the natural

² Page 65 of the Petition erroneously cites to *Naware* (EX1007) instead of *Tummala* (EX1005). The declaration of Petitioner's expert repeats the same erroneous citations. *See* EX1003 at ¶198.

result flowing from” the prior art); *Metall Zug AG et al v. Carl Zeiss Meditec AG*, IPR2020-00916, Paper 8 at 23-26 (PTAB Nov. 4, 2020) (declining to institute review because petitioner failed to explain how the prior art combination necessarily teaches a “line width” element of the independent claims). As discussed below, there are numerous deficiencies with the combination using *Tummala*. Additionally, despite the ’660 Patent’s disclosure that a tape coating had numerous issues and does not satisfy the claims (*supra* Section III; *see also* EX1001, 1:33-36, 1:54-64), Petitioner’s expert suggests that *Comb*’s teaching of a tape would necessarily satisfy these claimed elements. *See, e.g.*, EX1003, ¶206 (“likewise Comb’s “[t]op film 36a may be derived from . . . tapes”) (cited by Pet. at 68 (asserting that “Comb further discloses the same operative structural details” as the ’660 Patent)). Neither Petitioner nor its expert have explained why these claimed elements are necessarily present in the asserted combination and thus it is inappropriate to rely on inherency to establish obviousness.

Further, there are numerous deficiencies with Petitioner’s argument that *Tummala* teaches an adhesive polymer coating that provides satisfactory bonding of the extruded print material and that can be applied to the print pad as a gel and such disclosure complements removal of the printed 3D part. *See* Pet. at 48, 52, 61, 65, 69 (citing EX1005 at ¶¶[0005]–[0008], [0023], [0028], [0034], [0043], [0045], [0052]–[0053], [0063], Table 1). There is no disclosure in *Tummala* that its coating

both facilitates adhesion to the 3D object during printing and permits removal of the 3D object without chemical or mechanical removal and without damage to the polymer coating, plate, or 3D object. To the contrary, *Tummala* teaches a coating that generally does not permit removal at high temperatures (100°C) or in dry conditions. As shown by the yellow annotations to Table 1 of *Tummala* below, proper removal with a low adhesion or bonding strength typically requires a wet, room-temperature condition (e.g., 23°C).

TABLE I

Footprint	Raft	Print Pad	100° C. (Dry)	23° C. (Dry)	23° C. (Wet)
2 × 2	raft	anodized aluminum	>20 lbs	0-0.5 lbs	0-0.5 lbs
2 × 2	no raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
2 × 2	no raft	Course Grind textured glass	—	>20 lbs	0-0.5 lbs
3 × 3	raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
3 × 3	no raft	anodized aluminum	>20 lbs	19 lbs	0-0.5 lbs

Id. at ¶[0046]. As *Tummala* explains, the labels “dry” and “wet” refer to “whether or not the print pad and part were submerged in water,” a known a solvent. *Id.* at ¶¶[0046], [0036] (“a solvent comprises water”), [0037], [0068]. Absent the use of a raft, there is no disclosure in *Tummala* of enabling removal via a low adhesion or bonding strength (e.g., 0-0.5 lbs in *Tummala*) without the use of a chemical solvent. Thus, *Tummala* teaches that chemical removal is typically required, which is the opposite of “permitting removal of the 3D object once the 3D object has

been formed and cooled without chemically or mechanically removing the polymer coating from 3D object.”

The only condition in *Tummala* that may enable removal without a chemical solvent requires a raft, as shown by the blue annotation to Table 1 below.

TABLE I

Footprint	Raft	Print Pad	100° C. (Dry)	23° C. (Dry)	23° C. (Wet)
2 × 2	raft	anodized aluminum	>20 lbs	0-0.5 lbs	0-0.5 lbs
2 × 2	no raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
2 × 2	no raft	Course Grind textured glass	—	>20 lbs	0-0.5 lbs
3 × 3	raft	anodized aluminum	>20 lbs	>20 lbs	0-0.5 lbs
3 × 3	no raft	anodized aluminum	>20 lbs	19 lbs	0-0.5 lbs

Id. at ¶[0046]. However, as *Tummala* recognizes, the raft is used as an *intermediary* between the 3D object and print pad that itself must be removed. EX1005 at ¶[0004] (“[T]he print material is deposited . . . a ‘raft’ of support material disposed on the print pad[], which can result in the formation of a bond . . . between the surface of the raft and the surface of the print pad[.]”), ¶[0021] (“However, unlike the print material, the support material is subsequently removed to provide the finished three-dimensional part.”). *Tummala* does not describe the raft of support as the 3D object itself, nor does the Petition explain why the raft of support could be the 3D object or facilitate adhesion between the polymer coating and 3D object during printing. *See id.* Thus, *Tummala*’s teaching to use a raft to

achieve removal, fails to satisfy the element of claim 1 that requires “facilitating adhesion to the 3D object during printing.” *See also* EX1001 at 5:20-25

(“Therefore once the building of the object is finished, the object will pop off the plate 104 when the plate and part have cooled. This efficiently avoids the general issue in the current art, where the 3D object sticks to the heated build platform, and the object has to be dug out from the platform in order to remove it or having to remove the object from a support raft requiring an additional step to dissolve or mechanically remove the support from the part.”).

In addition, *Tummala* does not teach or disclose that the polymer coating does not need to be chemically or mechanically removed from the 3-D part, such as when the polymer coating is attached, in part or whole, to the raft of support material, which must subsequently be removed from the 3-D part. *See, e.g.*, EX1005 at [0021] (“However, unlike the print material, the support material is subsequently removed to provide the finished three-dimensional part.”);

Further, *Tummala* does not teach a permanent or reuseable coating that does not need to be removed from the printed part. Rather, the reference only discloses that the print pad (e.g., aluminum or glass in Table 1 above) itself can be reused. *See* EX1005 at [0006] (“print pads are often reusable”). In contrast to its reuseable print pad, *Tummala* teaches that its adhesive is applied at the start of each print of a 3D object, which indicates that the adhesive is not permanent or reuseable. *Id.* at

[0023] (“an adhesive can be applied to a print pad prior to beginning of a printing process”); *see also id.* at [0063] (“a method of printing a 3D article comprises applying an adhesive to a build surface of a print pad”). As a result, *Tummala* does not teach removal “without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object” because the purported coating is re-applied at the start of each printing process. Thus, *Tummala* as applied in the combination with *Comb*, whether being used to apply a non-tape adhesive coating as *Tummala* purportedly teaches or apply *Tummala*’s polymer, does not teach “without chemically or mechanically removing the polymer coating from 3D object and without damaging the polymer coating, the thermally conductive plate, or the 3D object.”

In light of these deficiencies in *Tummala*’s teachings, even if *Tummala* was combined with *Comb*, doing so does not cure the deficiencies of *Comb* and *Tummala*. Thus, *Comb*, *Tummala*, and the combination of those references fails to teach all elements of claim 1.

X. THE PETITION DOES NOT SHOW THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE UNDER GROUND 2B

Ground 2B involves the combination of *Comb*, *Tummala*, and *Kritchman*. Pet. at 76. Petitioner mainly relies on *Comb* and *Tummala* to address the

limitations of claim 1. In particular, Petitioner only relies on *Kritchman* in Ground 2B for its purported teaching of integrating a temperature control unit within a build platform. *See id.* at 78. For the other elements of claim 1, Petitioner relies on the same rationales as in Ground 2A. *See id.* at 77. Accordingly, Ground 2B fails to teach all elements of claim 1 and its dependent claims for at least the reasons discussed above for Ground 2A.

XI. ADDITIONAL COMMENTS

With respect to any arguments in the Petition that are not specifically addressed herein, Patent Owner does not concede the legitimacy of such arguments in the Petition and any underlying contentions in the Petition. If *inter partes* review is instituted, Patent Owner expressly reserves the right to rebut any such arguments and any such contentions at a later point, including in a Patent Owner Response. Patent Owner is not limited to the arguments presented here in this Preliminary Response and expressly reserves the right to raise further arguments, including claim construction arguments, not presented in this Preliminary Response.

XII. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board decline to institute *inter partes* review of the '660 Patent.

Respectfully submitted,

Dated: March 18, 2025

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Preliminary Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 10,908 words, excluding the parts that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used in preparation of this Preliminary Response.

Dated: March 18, 2025

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CERTIFICATE OF SERVICE

Pursuant to 37 CFR § 42.6(e)(4), the undersigned certifies that on March 18, 2025, a complete copy of the foregoing Patent Owner's Preliminary Response was served on Lead and Back-up Counsel for Petitioner at the service address provided in Petitioner's Mandatory Notices:

Email: IPR56224-0006IP1@fr.com

Dated: March 18, 2025

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