

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BILLERUD AKTIEBOLAG (PUBL),

Petitioner,

v.

WESTROCK MWV, LLC,

Patent Owner

Case No. IPR2023-01206

U.S. Patent No. 11,293,142 B2

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I. INTRODUCTION.....	1
II. BACKGROUND.....	1
A. The '142 Patent.....	1
B. Examination of the '142 Patent	6
II. CLAIM CONSTRUCTION.....	9
A. “hot-hard calender”.....	11
B. “counter roller”	18
IV. THE BOARD SHOULD EXERCISE ITS DISCRETION AND DENY INSTITUTION OF <i>INTER PARTES</i> REVIEW.....	20
A. The Board Has Discretion	20
B. The Test Under <i>Advance Bionics</i>	21
1. The New Art is Cumulative	22
2. The New Argument is Cumulative	23
3. Petitioner Has Not Demonstrated that the Office Erred In a Material Manner	24
C. The Test Under <i>Becton, Dickinson</i>	28
1. Similarities and Material Differences Between the Asserted Art and the Prior Art Involved During Examination.....	29
2. The Cumulative Nature of the Asserted Art and the Prior Art Evaluated During Examination.....	31
3. The Extent to Which the Asserted Art Was Evaluated During Examination, including Whether the Prior Art Was the Basis of a Rejection	31
4. The Extent of the Overlap Between Arguments Made During Examination and the Manner in Which Petitioner relies on the Prior Art.....	32

5. Whether Petitioner Has Pointed Out Sufficiently How the Examiner Erred in the Evaluation of the Asserted Prior Art	33
6. The Extent to Which Additional Evidence and Facts Presented in the Petition Warrant Reconsideration of the Prior Art or Arguments.....	33
D. The Reasoning Above Regarding <i>Papermaking</i> can readily be applied to the rest of the Asserted Art	35
IV. RESPONSE TO PETITIONER’S DETAILED EXPLANATION UNDER 37	
C.F.R. § 42.104(b)	36
A. Summary of the Art	36
1. Overview of <i>Fugitt</i>	36
2. Overview of <i>Papermaking</i>	38
3. Overview of <i>Gratton</i>	39
4. Overview of <i>Papermaking II</i>	41
5. Overview of <i>Mohan</i>	41
B. Ground 1: Claims 1, 2, and 5-23 are patentable over <i>Fugitt</i> in view of <i>Papermaking</i> and <i>Mohan</i>	42
a. Claim 1	42
b. Claim 2	49
c. Claim 5	50
d. Claims 6-14 and 16-22.....	51
e. Claim 15	51
f. Claim 23	51
C. Ground 2: Claims 1, 2, and 4 are Patentable under 35 U.S.C. § 103 over <i>Fugitt</i> in view of <i>Papermaking</i> , <i>Gratton</i> , and <i>Mohan</i>	52
a. Claim 1	52
b. Claims 2 and 4	55

D. Ground 3: Claim 4 is Patentable Under 35 U.S.C. § 103 over <i>Fugitt</i> in view of <i>Papermaking</i> , <i>Papermaking II</i> , and <i>Mohan</i>	55
a. Claim 4	56
V. CONCLUSION	56

TABLE OF AUTHORITIES

	Page(s)
Cases	
<i>Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH,</i> IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020).....	<i>passim</i>
<i>Becton, Dickinson & Co. v. B. Braun Melsungen AG,</i> IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017)	33, 34, 36, 39
<i>DK Crown Holdings, Inc. v. Diogenes Limited,</i> IPR2023-00268, Paper 9 (PTAB Aug. 11, 2023).....	16
<i>Panduit Corp. v. Corning Optical Communications LLC,</i> IPR2021-01562, Paper 20 (PTAB Apr. 6, 2022).	33
<i>Phillips v. AWH Corp.,</i> 415 F.3d 1303 (Fed. Cir. 2005) (en banc)	15, 57
<i>Samsung Elec., Ltd. v. Power2B, Inc.,</i> IPR2022-00300, Paper 38 (PTAB Jun. 15, 2023)	16
Statutes	
35 U.S.C. § 103	57, 60
35 U.S.C. § 314 (2022)	25
35 U.S.C. § 325(d)	25, 26, 27
Other Authorities	
37 C.F.R. 42.100(b) (2020).....	16
37 C.F.R. § 42.4(a).....	25
37 C.F.R. § 42.104(b)	41
37 C.F.R. § 42.108(c).....	6
83 Fed. Reg. 51,340 (Nov. 13, 2018).....	16

PATENT OWNER'S EXHIBIT LIST

<u>Exhibit</u>	<u>Short Name</u>	<u>Description</u>
Ex. 2002	<i>Mohan</i>	U.S. Patent No. 6,274,001 to K. Krishna <i>Mohan</i> , granted August 14, 2001
Ex. 2003	Klass Declaration	Declaration of Charles P. Klass

I. INTRODUCTION

Institution of *Inter Partes* Review should be denied because the asserted art and arguments presented in the Petition are cumulative of art and arguments that were before the Examiner, and there was no error or material error on the part of the Examiner. In addition, Petitioner has failed to meet its burden under 37 C.F.R. § 42.108(c) to establish a reasonable likelihood of success that the Challenged Claims are unpatentable over the asserted art.

II. BACKGROUND

A. The '142 Patent

WestRock MWV, LLC (hereinafter “Patent Owner”) filed an application for U.S. Patent No. 11,293,142 B2 (hereinafter “the '142 Patent”) on May 7, 2020 and was assigned Serial No. 16/869,156 (“the '156 Application”) and included a priority claim to a previously filed provisional application, namely U.S. Provisional Patent Application Serial No. 62/846,278 filed May 10, 2019. The '142 Patent issued on April 5, 2022. The title of the '142 Patent is “Smooth and low density paperboard structures and methods for manufacturing the same.”

The “Background of the Invention” section of the '142 Patent explains that conventional paperboard manufacturing techniques achieved smoothness through a wet stack calendering process in which the paperboard is rewetted and passed through a calendering device having two or more hard rolls. The '142 Patent stated that while wet stack calendering smooths paperboard by compressing the fiber

network through a nip load, the density of the paperboard is increased. (Ex. 1001, 1:28-39). The patent explained that the increased density is not a desired characteristic for most paperboard structures, and that traditionally a tradeoff must be struck between smoothness and density for paperboard. (*Id.* at 1:35-39). The '142 Patent represents an advance over the prior conventional techniques, specifically, an improvement in the tradeoff between smoothness and density for paperboard, e.g., achieving greater smoothness with less density. (Ex. 2003, ¶30).

The “Detailed Description” section of the '142 Patent explains the inventive process of manufacturing a paperboard substrate with reference to Fig. 2, which is reproduced below.

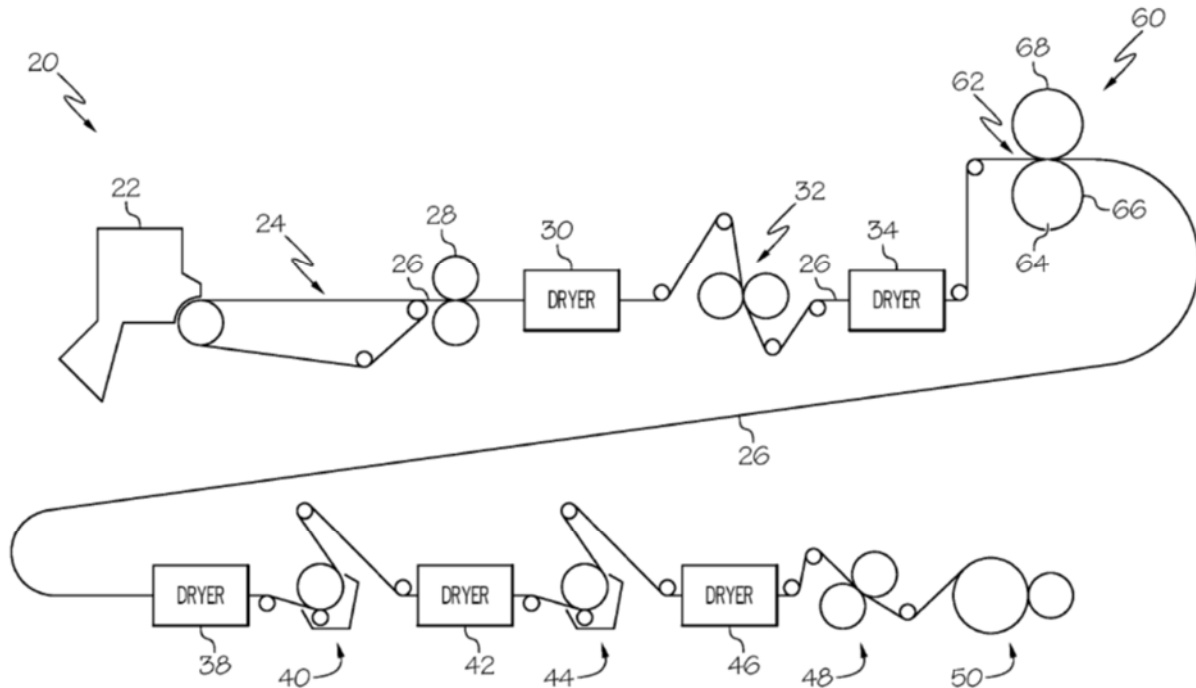


FIG. 2

Beginning from a headbox 22, which discharges a fiber slurry onto a Fourdrinier 24, a paperboard substrate 26 passes through one or more wet presses 28, one or more driers 30, a size press 32, and an optional dryer 34. (*Id.* at 5:27-36). Then the paperboard substrate 26 passes through a hot-hard calender 60 to become a calendered paperboard substrate. (*Id.* at 5:37-38). It is this hot-hard calender 60 that is a point of much discussion in the present proceeding. After the hot-hard calender 60, the calendered paperboard substrate passes through one or more dryers 38, 46, and coaters 40, 44, then optionally through a gloss calender 48 and finally onto a reel 50. (*Id.* at 6:5-22). The hot-hard calender 60 includes a nip 62 defined between rollers 64, 68, which can be loaded to apply a nip load to the paperboard substrate 26 passing therethrough. (*Id.* at 5:39-40). The two rollers 64, 68 include a thermo-roller 64 and a counter roller 68. (*Id.* at 5:40-42). The contact surface 66 of the thermo-roller 64, i.e., the surface that contacts the paperboard substrate, is heated to an elevated temperature. (*Id.* at 5:45-47).

The '142 Patent provides Examples 1-6 for six different paperboard structures. (*Id.* at 6:40-10:5). The Examples provide the details of the coatings used, the basis weights of the paperboard substrate before calendering and coating, the nip loads used in the hot-hard calendering, the thermo-roller contact surface temperature for each example, and the resulting surface smoothness and basis weight for each example. The six examples give thermo-roller contact surface

temperatures of 480 °F for Examples 1-3 and 500 °F in Examples 4-6. For Examples 1-3, the initial paperboard substrate had a basis weight of 145 lbs/3000 ft², and for Examples 4-6, the initial paperboard substrate had a basis weight of 104 lbs/3000 ft².

The resulting surface smoothness, measured in Parker Print Surf (PPS 10S), ranged from 1.7 to 1.9 microns for Examples 1-3, where the contact surface temperature was 480 °F, and ranged from 1.3 to 1.4 microns for Examples 4-6, where the contact surface temperature was 500 °F. The resulting bulk, inferred from caliper points (where more points means a less dense, more desirable paperboard), for Examples 1-3 ranged from 15.1 to 15.5 points, where the contact surface temperature was 480 °F, and ranged from 10.3 to 10.6 points, where the contact surface temperature was 500 °F.

The '142 Patent also gives six comparative examples, one for each of the six examples described above. The comparative examples each started with the same paperboard substrate as their respective one of the six examples, but were calendered with a traditional 4-nip calender with roller surface temperatures of 200 °F and considerably higher nip loads. By comparison, the comparative examples ended up with higher density paperboard structures over a comparable range of smoothness. This can be seen in TABLE 2 of the '142 Patent. To a person of ordinary skill in the art, this proves that the hot-hard calendering disclosed in the

'142 Patent yields a better tradeoff between density and surface smoothness than with traditional calendering. (Ex. 2003, ¶38).

Fig. 4 in the '142 Patent, reproduced and annotated below, shows caliper density versus caliper points for Examples 1-6 and for numerous prior art points. Notice the separate groupings of data points for Examples 1-3 and for Examples 4-6, which both show lower density than the prior art data points of comparable caliper. Thus, Fig. 4 shows an advance into an area of density/caliper space that was previously unattained. (*Id.* at ¶39).

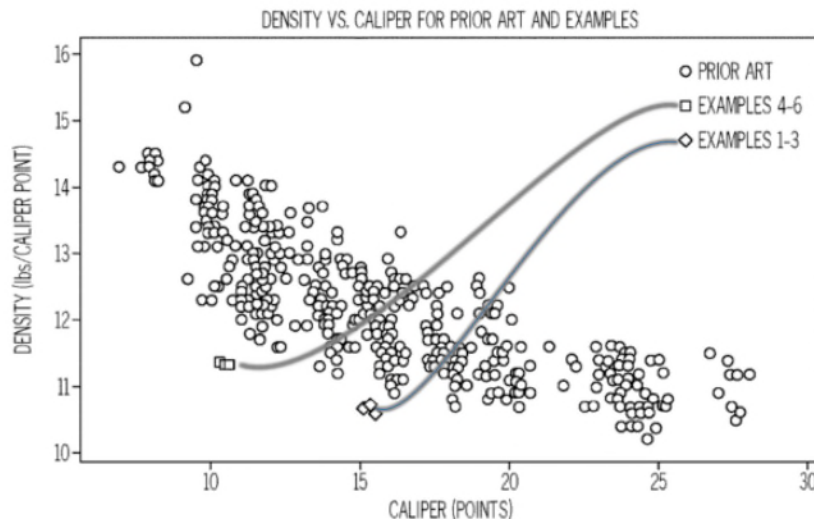
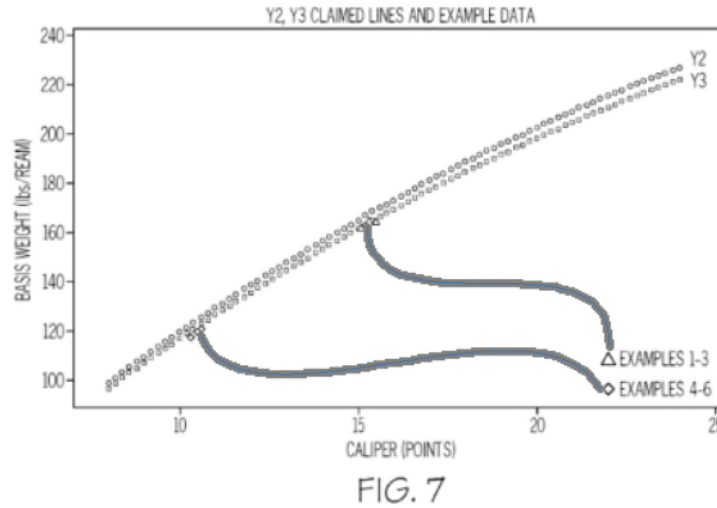


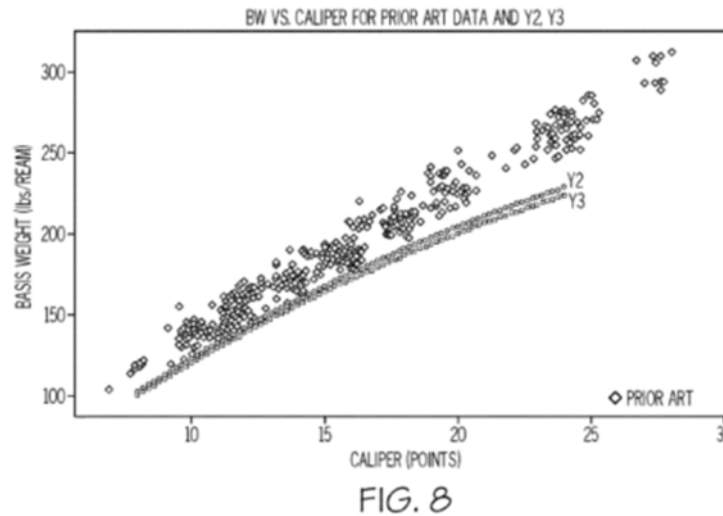
FIG. 4

Fig. 7 in the '142 Patent, reproduced and annotated below, shows two parabolic curves of basis weight as a function of caliper points. Basis weight is related to density such that a lower basis weight is desirable. (*Id.* at ¶40). Notice in particular that the curve labeled Y₂ is recited as an element in Claim 1, i.e.,

$Y_2 = 3.71 + 13.14X - 0.1602X^2$. As shown in the annotated version of Fig. 7 below, all six of the examples in the '142 Patent are below the Y_2 curve. (*Id.*).



In Fig. 8, reproduced below, the Y_2 curve is shown again, this time with the prior art data points, which all lie above the Y_2 curve. (*Id.*).



B. Examination of the '142 Patent

On May 7, 2020, Patent Owner filed the '156 Application that issued as the '142 Patent. The '156 Application included an Information Disclosure Statement

citing U.S. Patent No. 6,274,001 to *Mohan*, granted August 14, 2001 (hereinafter “*Mohan*”). (Pet., Ex. 1002, pp. 55-57). *Mohan*, along with other references cited in the Information Disclosure Statement, is listed on the face of the ’142 Patent among the References cited, confirming the Examiner considered *Mohan* during prosecution of the ’142 Patent. (Ex. 1001, p. 1).

Examiner Mark Halpern was assigned to the ’156 application. Examiner Halpern was a member of Art Unit 1748, dedicated to Paper Making and Fiber Liberation. (See, e.g., Ex. 1002, pp. 73-75).

During prosecution of the ’156 Application, the Examiner issued a Non-Final Office Action that rejected the claims over U.S. Patent Application Publication No. 2009/0236062 to *Fugitt*, et al. (“*Fugitt*”). (See, e.g., Ex. 1002, pp. 73-75). In the Non-Final Office Action, Claims 1-3 were the only claims under consideration. (*Id.*). The Examiner rejected Claim 1 as anticipated by *Fugitt* and rejected Claims 2-3 as obvious over *Fugitt*. (*Id.*). Claim 3 recited an “elevated temperature is at least 250 °F.” (*Id.*, see also, Ex. 1002, p. 12). In rejecting Claim 3, the Examiner stated, “[t]he thermo-roller elevated temperature is not disclosed [in *Fugitt*], however, it would have been obvious to one skilled in the art at the time the ’156 Application was filed, that the thermo-roller elevated temperature be optimized in order to obtain desired smoothness of the paperboard product.” (Ex. 1002, p. 75).

In reply to the Non-Final Office Action, Patent Owner submitted an amendment and response, adding language to Claim 1 reciting that the thermo-roller is “heated to an elevated temperature of at least 250 °F,” as in original Claim 3, and amended the temperature recited in Claim 3 to be at least 500 °F. (Ex. 1002, pp. 82-89). Patent Owner argued that while “[t]raditional calenders may employ rollers that are heated to temperatures that are greater than ambient temperature... the claimed method requires a temperature that is significantly hotter than traditional temperatures—specifically, an elevated temperature of at least 250 °F—which is not disclosed or suggested by *Fugitt*...” (*Id.* at 88).

The Examiner accordingly updated his search in view of Patent Owner’s amendments and arguments. (Ex. 1002, p. 108). Ultimately, the Examiner found Patent Owner’s argument persuasive. (*Id.* at 103). In a Notice of Allowance dated November 11, 2021, the Examiner stated that the primary reason for allowance was “the cited prior art does not disclose a method for manufacturing a paperboard structure per steps claimed, the method including passing a paperboard substrate through a nip of a hot-hard calender, wherein the nip is defined by a thermo-roller and a counter roller, and wherein the contact surface of the thermo-roller is heated to an elevated temperature of at least 250 °F (claim 1).” (*Id.*).

The Zotterman Declaration at ¶85 contends that the temperatures in *Papermaking* contradict Patent Owner’s statement above. (Ex. 1003, pp. 30-31).

But Patent Owner's statement about the traditional calender temperatures *is* correct because the temperatures in *Fugitt* were in fact in line with the traditional calender temperatures. (Ex. 2003, ¶43).

Petitioner and Zotterman simply failed to appreciate that the context of the exchange between the Examiner and Patent Owner included the caliper/basis weight range bounded by the equation in Claim 1. (Ex. 2003, ¶44). In discussing the prosecution of the '142 Patent, the Zotterman Declaration did not properly account for the Y_2 curve recited in Claim 1. (*Id.*). Indeed, the temperature range of at least 250 °F added to Claim 1 distinguished over *Fugitt*. (*Id.*). But the smoothness, caliper, and basis weight in *Fugitt* were obtained using special coatings and not with the roller temperature per se. (*Id.*). The Y_2 equation in Claim 1 instead implies temperatures not of exactly 250 °F, but above 250 °F. (*Id.*). In view of this, and given the Y_2 equation of Claim 1, the recited temperature range of above 250 °F contemplates temperatures approaching 480-500 °F, as noted in the examples in the '142 Patent. (*Id.*). Thus, Patent Owner's remarks during prosecution were consistent with Claim 1 and with the traditional calender temperatures. (*Id.*).

II. CLAIM CONSTRUCTION

Patent Owner does not agree with Petitioner's claim construction set forth in the Petition for the claim terms "hot-hard calender" and "counter roller." Patent

Owner does not dispute Petitioner’s claim construction for the terms “paperboard substrate,” “nip,” “thermo-roller,” “basecoat,” and “topcoat.” Patent Owner reserves the right to argue any of Petitioner’s claim constructions in the future even if such constructions are not explicitly disputed herein.

When construing the claims, while the Board may consider extrinsic evidence, including expert testimony, such extrinsic evidence is less significant than the intrinsic record. (*See, e.g., Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc); *see also, DK Crown Holdings, Inc. v. Diogenes Limited*, IPR2023-00268, Paper 9 (PTAB Aug. 11, 2023)). And, when “an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term[,] . . . it is improper to rely on extrinsic evidence”).” (*Samsung Elec., Ltd. V. Power2B, Inc.*, IPR2022-00300, Paper 38 (PTAB Jun. 15, 2023), citing *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996)).

The proper claim construction should rely upon the intrinsic record, i.e., the ordinary and customary meaning as understood by one of ordinary skill in the art and prosecution history. (*See*, 83 Fed. Reg. 51,340 (Nov. 13, 2018); 37 C.F.R. 42.100(b) (2020)). However, the claim construction of the disputed terms in the Petition cites copiously from the Zotterman Declaration (Ex. 1003), and from the asserted art, *Papermaking* and *Gratton*. (Pet., pp. 6-12). There is no explanation in the Petition for tying such extrinsic evidence to the file history or the ordinary and

customary meaning of the disputed terms as understood by one of ordinary skill in the art. Moreover, the sparse citations to the intrinsic record in Petitioner's claim constructions contain faulty logic. In contrast, Patent Owner's constructions are explained in detail, citing to the supportive intrinsic evidence in compliance with 37 C.F.R. 42.100(b).

For the purposes herein, a person having ordinary skill in the art is a person with a bachelor's degree in paper science and engineering, chemical engineering, process engineering, mechanical engineering, or a related degree with no more than three to five years of experience in paperboard manufacturing, or a person with a master's degree as their highest degree in paper science and engineering, chemical engineering, process engineering, or mechanical engineering, or a similar field with a specialization in paperboard manufacturing. (Ex. 2003, ¶26).

A. “hot-hard calender”

Claims 1, 2, 4, and 5 recite the term “hot-hard calender.” “Hot-hard calender” should be construed according to its plain meaning to mean “a calender defined by at least two hard rollers wherein one roller is heated to the elevated temperature.” The elevated temperature is defined as “at least 250 °F” in Claim 1 and further defined as “at least 500 °F” in Claim 3. Examples of suitable hard rollers include metallic or heat resistant resin composite rollers. (Ex. 1001, 5:42-44).

Patent Owner's construction of "hot-hard calender" as including only one roller heated to the elevated temperature is correct because it is supported by the intrinsic evidence. Every mention of the hot-hard nip in the '142 Patent includes a thermo-roller and a counter roller where the contact surface of the thermo-roller is heated to an elevated temperature. (*See* Ex. 1001, 2:1-5, 5:37-51, 6:47-50, 7:17-20, 7:54-57, 8:25-28, 8:62-65, 9:32-35). The heated surface of the thermo-roller is labeled with reference character 66 in the drawings and is described in the '142 Patent as being heated to at least 250 °F. (Ex. 1001, 5:63-65). There is no reference character given for the surface of any counter-roller of a hot-hard calender, nor any mention of heating any counter-roller of a hot-hard calender, nor is the temperature of the surface of any counter-roller discussed for a hot-hard calender. (*See generally*, Ex. 1001). Moreover, as oriented in Fig. 2, it is the bottom side of the paperboard substrate that contacts the heated contact surface 66, and with the configuration of coaters 40 and 44 shown, only this one side of the paperboard substrate is coated. (Ex. 1001, Fig. 2). In order to avoid unnecessary densification of the paperboard substrate, the uncoated side would not be heated to the elevated temperature in the hot-hard calender. (Ex. 2003, ¶34).

Information about the heating of the hot-hard calender can also be inferred from what the '142 Patent says about the optional gloss calender, which can be used after the hot-hard calender, e.g., as a finishing process. (Ex. 1001, 6:13-17). For each example given in the '142 Patent, there is a final calender process that is a gloss-type calender (not recited in Claim 1) where roller surface temperatures (plural) were maintained at around 200 °F. (*See* Ex. 1001, 7:2-3, 7:35-40, 8:5-11, col. 8:43-49, col. 9:13-18, and col. 9:50-55). The fact that the “hot-hard calender” is only ever mentioned in the context of the thermo-roller being heated, and that in every example of the gloss-type calender the '142 Patent indicates plural surface temperatures heated to 200° F, substantiates that any counter rollers in the hot-hard calender are not heated to the elevated temperature. (Ex. 2003, ¶59).

“Hot-hard calender” should not be construed to mean “at least one roller is heated to a temperature above ambient temperature” as stated in Petitioner’s construction. (Pet., p. 8). For one thing, ambient temperature is not referenced anywhere in the '142 Patent. More importantly, Petitioner’s construction improperly encompasses calenders where more than one roller is heated to the elevated temperature. (Ex. 2003, ¶53). There is no basis in the intrinsic record for extending the scope of “hot-hard calender” to include calenders with more than one roller heated to the elevated temperature. Petitioner’s inclusion of calenders

having more than one roller heated to the elevated temperature appears to rely entirely on the Zotterman Declaration at ¶¶ 59 and 70. (Pet., pp. 8-9).

Paragraphs 59 and 70 in the Zotterman Declaration are the places Zotterman insinuates a hot-hard calender has more than one roller heated to the elevated temperature. However, neither the Petition nor the Zotterman Declaration provides any reasoning or evidence to support their construction that a hot-hard calender can have more than one roller heated to the elevated temperature. (Ex. 2003, ¶54).

Aside from the unproven statements made in ¶¶ 59 and 70 of the Zotterman Declaration, other portions of the Zotterman Declaration that provide citations to the intrinsic record actually support a claim construction where only one roller is heated to the elevated temperature. (*See*, Ex. 1003 at ¶¶ 59-65, e.g., ¶60). For instance, the Zotterman Declaration states “[f]igure 2 of the ’142 patent provides the hot-hard calender ‘compris[es] a nip defined by a thermo-roller and a counter roller.’” Conspicuously missing is any suggestion that the counter roller may be heated to the elevated temperature. (Ex. 1003 at ¶¶ 59-65, e.g., ¶ 60). Simple logic predicates that calling one roller a “thermo-roller” and specifying its surface temperature range, while referring to the other roller as “counter roller” without any mention of its surface temperature, means that only the thermo-roller is heated to the elevated temperature. (Ex. 2003, ¶55). There is only one thermo-roller in each calender shown or described in the ’142 Patent. (*Id.*). There is no calender in

the '142 Patent that has more than one thermo-roller. (*Id.*). The weaknesses of the assertions in ¶¶ 59 and 70 of the Zotterman Declaration are further discussed below.

First, with respect to ¶ 59 of the Zotterman Declaration, there is no explanation or authority cited for why “hot-hard calender” should be construed to include more than one roller heated to a temperature above ambient. (Ex. 1003 at ¶ 59). Petitioner and Zotterman instead appear to be paraphrasing from *Papermaking*, which says “[t]he temperature gradient calender is a two-roll hard-nip calender with at least one of the rolls heated to high operating temperatures.” (See Ex. 1005, p. 40). A temperature above ambient, as in Petitioner’s construction, is not a high operating temperature per the previous quotation from *Papermaking*. (Ex. 2003, ¶56). The foregoing quote from *Papermaking* describes a type of calender called a “temperature gradient calender,” and there is no reason provided in the Petition or in the Zotterman Declaration for why a “temperature gradient calender” should be equated with a “hot-hard calender” as disclosed in the '142 Patent. (*Id.*). The Zotterman Declaration appears to be attempting to appropriate *Papermaking*’s definition of “temperature gradient calender” as extrinsic evidence to broaden “hot-hard calender” as recited in Claim 1 to include at least one roller heated to the elevated temperature. (*Id.*). But the intrinsic record only supports one roller heated to the elevated temperature.

Second, the Zotterman Declaration’s line of reasoning is undermined by the fuller context of *Papermaking*, which goes on to say, “[h]eating up both nip rolls, however, is complicated because the other roll is a deflection-compensated roll. Because of the benefits of soft-calender technology, this kind of calendering has remained very rare in spite of the amount of research work done.” (*See* Ex. 1005, p. 40). This quote from *Papermaking* clearly undercuts any notion that the plain meaning of “hot-hard calender,” as understood by one of ordinary skill in the art, would include a “very rare” and “complicated” counter roller from *Papermaking*. (Ex. 2003, ¶56).

Petitioner and Zotterman made a contorted attempt to apply the intrinsic record to construe “hot-hard calender,” but that attempt contains fundamentally flawed logic. (*Id.* at ¶57). Specifically, Petitioner tried to twist the Examiner’s characterization of the calender in *Fugitt* in the Non-Final Office Action to support its proposed construction of the term. In the Office Action, the Examiner stated that “at least some of the rolls in nips with counter rolls in the calender 36 are steam heated to an elevated temperature [0026].” (Ex. 1002, p. 45, citing Ex. 1004, [0065]). However, this statement does not broaden the meaning of “hot-hard calender” beyond its plain meaning to include more than one roller heated to the elevated temperature in Claim 1. (*Id.*). A straightforward reading of “at least some

of the rolls in nips with *counter rolls*” necessarily excludes “*counter rolls*” from the “rolls” that are “steam heated to an elevated temperature.”

What *Fugitt* says at [0026] is merely that “[t]he rolls of the calender may be steam heated.” (Ex. 1004, [0026]). In formulating the rejection, the Examiner needed to find a thermo-roller in *Fugitt*. The fact that *Fugitt* discloses more than one roll of the calender 36 may be steam heated was sufficient for the Examiner to cite *Fugitt* as teaching a thermo-roller. It should be noted that the calender in *Fugitt* is a dry stack calender 36 with six rolls through which the substrate would snake, which is very different from the hot-hard calenders shown in the ’142 Patent. (Ex. 2003, ¶57). Regardless, none of this implies that the counter-roller in the “hot-hard calender” nip of Claim 1 is heated to the elevated temperature. (*Id.*). It does not follow logically that Claim 1 should be broadened to include multiple rollers heated to the elevated temperature just because *Fugitt* is broad enough to encompass multiple heated rollers. (*Id.*).

While Patent Owner’s claim constructions rely upon the intrinsic evidence, Patent Owner will also address *Papermaking*, since the Petition and the Zotterman Declaration rely upon it so heavily. *Papermaking* lists various types of calenders including: hard-nip calenders, two-roll hard-nip calenders, soft calenders, gloss calenders, two-roll soft calenders, three-roll soft calenders, supercalenders, multi-nip calenders, Janus calenders, OptiLoad calenders, ProSoft calenders, show-nip

calenders, metal belt calenders, wet stack calenders, breaker stack calenders, friction calenders, embossing calenders, and pre-calenders. (Ex. 1005 at pp. 35-67 and 82). There is no definition given in *Papermaking* for “hot-hard calender” despite the foregoing encyclopedic list of calender types featured in the reference. Indeed, the lack of any mention of a “hot-hard calender” in *Papermaking* confirms that the inventors of the ’142 Patent designated a new type of calender as a “hot-hard calender.” (Ex. 2003, ¶60). This underscores the importance of turning inward to the intrinsic evidence for constructing “hot-hard calender.”

The Board should adopt Patent Owner’s construction of “hot-hard calender” because it is directly supported by the intrinsic evidence, as explained above. Petitioner’s construction of “hot-hard calender” should be rejected because it is inconsistent with the intrinsic record and instead relies heavily on inferences derived from extrinsic evidence.

B. “counter roller”

Patent Owner disputes Petitioner’s construction of “counter roller” to the extent that Petitioner’s construction of “hot-hard calender” implies that the “counter roller” may be heated to the elevated temperature (*see* Claim Construction (A), above), and to the extent that the Zotterman Declaration implies a “counter roller” can itself be a thermo-roller.

The “counter roller” should not be construed as being heated to the elevated temperature for the reasons already set forth above in Patent Owner’s construction of “hot-hard calender.” Patent Owner already explained that the “hot-hard calender” has only one thermo-roller heated to the elevated temperature in accordance with the plain and ordinary meaning derived from the intrinsic evidence.

The Zotterman Declaration at ¶70 states that a “counter roller” is a roller that is opposite of a thermo-roller. (Ex. 1003 at ¶70). That seems plain enough, but the next sentence in ¶70 says “*Gratton* further demonstrates this,” citing to *Gratton* Fig. 1. (Ex. 1003 at ¶70, citing Ex. 1006 at Figure 1, p. 81). There is no substance to this non sequitur. (Ex. 2003, ¶64). *Gratton* does not demonstrate that a “counter roller” is a roller that is opposite of a thermo-roller. (*Id.*). In *Gratton*, there are two rollers, both of which are shown to be heated to the same temperature. (Ex. 1006 at Fig. 1). There is no scenario in which one roller in *Gratton* is a thermo-roller and the other is a counter roller. (*Id.*). Both rollers are thermo-rollers in *Gratton*, and thus the calender in *Gratton* is not a hot-hard calender as in Claim 1 of the ’142 Patent. (*Id.*). The configuration in *Gratton* heats both sides of a paperboard substrate passing through the nip, giving up bulk on both sides to smooth both surfaces. (*Id.*). It is undesirable to give up bulk according

to the '142 Patent, which avoided including any examples of heating both sides of a paperboard substrate. (*Id.*).

The rest of ¶70 in the Zotterman Declaration discusses how some paperboard grades could benefit from hot calendering on both surfaces. (*Id.* at ¶65). But Zotterman failed to mention the drawback of calendering both surfaces, which gives up bulk and increases density, versus only hot-calendering one surface. (*Id.*). This is contrary to the drive for lower density, higher bulk paperboard explained in the '142 Patent. (Ex. 2003, ¶65).

Rather than base construction for “counter roller” upon the plain and ordinary meaning as apparent from the intrinsic record, the Zotterman Declaration at ¶70 prefers to rely upon *Gratton* and upon Zotterman’s own unsupported statements about some paperboard grades. (Ex. 2003, ¶66). Patent Owner’s construction of “counter roller” does not erode the plain and ordinary meaning, and does not contradict the intrinsic evidence with extrinsic evidence, as does Petitioner’s and Zotterman’s claim constructions of “counter roller.”

IV. THE BOARD SHOULD EXERCISE ITS DISCRETION AND DENY INSTITUTION OF *INTER PARTES* REVIEW

A. The Board Has Discretion

The Board has discretion to determine whether to institute *Inter Partes* Review (“IPR”). (35 U.S.C. § 314 (2022); 37 C.F.R. § 42.4(a)). Under 35 U.S.C. § 325(d), “in determining whether to institute [*inter partes* review], the Director may

take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” (35 U.S.C. §325(d)). Here, the same or substantially the same prior art or arguments that were previously presented to the Office are now made in the Petition, and Petitioner has failed to show error in the consideration of that art or argument. (*Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8–9 (PTAB Feb. 13, 2020) (precedential). The Board should therefore deny institution under 35 U.S.C. § 325(d).

Additionally, Petitioner is not likely to succeed on the merits, as will be demonstrated herein, and thus the Board should also deny institution on this ground.

B. The Test Under *Advanced Bionics*

In evaluating arguments under § 325(d), the Board uses a two-part framework as outlined in *Advanced Bionics*:

- (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office; and
- (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

(*Advanced Bionics*, Paper 6, p. 8).

In the present case, both conditions of prong (1) have been met because Petitioner has presented substantially the same art and the same or substantially the same arguments that were considered previously by the Office. In addition, Petitioner has failed to demonstrate that the Office erred in a manner material to patentability of the challenged claims under prong (2). These arguments are set forth below.

1. The New Art is Cumulative

In *Advanced Bionics*, the Board examined whether the reference not considered by the Examiner on which the petitioner relied was substantially the same as art the Examiner cited during prosecution, such that the petitioner's reference disclosed substantially the same information as the previously cited art in relevant part. (*See generally, Advanced Bionics*, Paper 6). If the Board determines the answer to this examination is yes, then the references are substantially the same. (*Id.*).

In the present case, *Papermaking* is cumulative to *Mohan* because Petitioner relies upon *Papermaking* for the same information that the Examiner previously considered in *Mohan*. Specifically, Petitioner relies upon *Papermaking* for its teaching of elevated roller surface temperature of at least 250 °F. (Pet., pp. 14-15). This surface temperature is what the Examiner and Patent Owner agreed was

missing from *Fugitt*, and is what Petitioner relies on in *Papermaking* to establish obviousness of Claim 1 based on a combination with *Fugitt*. (*Id.*).

However, *Mohan* was cited by Applicant, considered by the Examiner, and listed on the face of the '142 Patent among the references cited. (Ex. 1002, pp. 77-78). *Mohan* discloses an elevated calender roller surface temperature of at least 250 °F. (Ex. 2002, 4:45-57). Since *Mohan* was already considered by the Examiner, and since *Mohan* already disclosed the very teaching for which Petitioner is now citing *Papermaking*, *Papermaking* is cumulative to *Mohan*.

2. The New Argument is Cumulative

The first prong of the *Advanced Bionics* test also contemplates whether the same or substantially the same arguments were previously presented to the Office. (*Advanced Bionics*, Paper 6, p. 8). In the present case, Petitioner argues that it would be obvious to use the 200 °C (392 °F) temperature stated in *Papermaking*, which is in the range of the “at least 250 °F” temperature recited in Claim 1. (Pet., p. 31). However, the argument that it would be obvious to use a temperature of “at least 250 °F” was already raised by the Examiner in rejecting original Claim 3. (Ex. 1002, pp. 74-75). Patent Owner demonstrated to the Examiner that while “[t]raditional calenders may employ rollers that are heated to temperatures that are greater than ambient temperature... the claimed method requires a temperature that is significantly hotter than traditional temperatures—specifically, an elevated

temperature of at least 250 °F—which is not disclosed or suggested by *Fugitt*...”

(Ex. 1002, p. 103).

The issue of whether it would be obvious to use a roller surface temperature of at least 250 °F was thus already considered and was at the heart of the Examiner’s reasons for allowance. (*Id.*). Petitioner admits that the Examiner deemed the roller temperature to be “critical to patentability.” (Pet., p. 15). Therefore, Petitioner’s arguments based on *Papermaking* are cumulative to the arguments already considered by the Examiner.

3. Petitioner Has Not Demonstrated that the Office Erred In a Material Manner

For the second prong of the *Advanced Bionics* framework, the Board has held with respect to material error that “if reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability.” (*Advanced Bionics*, Paper 6, p. 9).

In the present case, reasonable minds can and do disagree regarding the purported treatment of the art or arguments. Specifically, the Examiner, Patent Owner, and Patent Owner’s technical expert Charles Klass have a reasonable-minded basis for disagreeing with Petitioner, i.e., that it would *not* have been obvious to use calender roll temperatures of at least 250 °F in the *Fugitt* process to arrive at the paperboard product recited in Claim 1, regardless of whether the roller temperature teaching is derived from *Papermaking* or *Mohan*.

Moreover, the temperature recited in Claim 1 is only one aspect of the claim.

Also recited in Claim 1 are a Parker Print Surf (PPS 10S) smoothness being at most 3 microns, and a polynomial relationship between basis weight Y_2 as a function of caliper thickness X . (Ex. 1001, 12:32-53). These additional aspects increase the complexity of the process significantly. A person skilled in the art would not expect that turning up the temperature in the calender stack of *Fugitt* to the temperatures disclosed in *Papermaking* or *Mohan* would result in a paperboard structure having the smoothness recited in Claim 1 together with the recited relationship of basis weight as a function of caliper thickness. (Ex. 2003, ¶¶93-94). In fact, as pointed out by Petitioner, the paperboard products disclosed in *Fugitt* attained the smoothness and basis weight Y_2 as a function of caliper thickness as is, i.e., without having to raise the roller surface temperatures up to 392-428 °F as stated in *Papermaking* and *Mohan*. (Ex. 2003, ¶93; *see also* Pet., pp. 35-36).

Turning up the heat in the *Fugitt* process to temperatures as high as 392-428 °F would have overshoot the basis weight Y_2 as a function of caliper thickness recited in Claim 1, so the resulting paperboard product would fail to reach the area below the Y_2 curve recited in the claim. (Ex. 2003, ¶93). This is explained in further detail below. (*See infra* §IV(B)(1)(a)). It would therefore not have been obvious to use the 250-400 °F temperature disclosed in *Mohan* for the process described in *Fugitt* for the same reasons given with respect to *Papermaking*. (*Id.*).

At a minimum, it is abundantly evident that reasonable minds differ with Petitioner on the purported treatment of the art and arguments. Within the framework of *Advanced Bionics*, the reasonable-mind difference precludes a finding that the Office erred in a manner material to patentability in the present case.

In determining whether the Examiner erred, the Board must also consider whether “Petitioner demonstrate[d] that the Examiner erred in the evaluation of the prior art, for example, by showing that the Examiner misapprehended or overlooked specific teachings in the relevant prior art such that the error by the Office was material to the patentability of the challenged claims.” (*Advanced Bionics*, Paper 6, p. 21). In the present case, Petitioner has not made any showing that the Examiner misapprehended or overlooked specific teachings in the relevant prior art, such that any alleged error made by the Office was material to patentability. Aside from conclusory statements regarding Examiner errors, Petitioner only alleges one error on the part of the Examiner, namely, that the Examiner should have performed a supplemental search of the prior art focused on temperature. (Pet., p. 16).

But further searching to find the temperature was not needed, since *Mohan* and its teaching of temperature were cumulative to *Papermaking*, and the Examiner signed form 1449 indicating that *Mohan* was considered on the same day the Examiner submitted his own search results for the Non-Final Office Action.

(Ex. 1002, pp. 77-78). Moreover, Petitioner has improperly alleged, without evidence, that the Examiner did not perform any supplemental searching for the roller temperature. In fact, the Examiner did conduct a supplemental search after the amendments and arguments regarding roller temperature. (Ex. 1002, p. 108, EAST search history appended to the Notice of Allowance). Petitioner has offered no evidence that the Examiner's supplemental search did not contemplate the roller temperature issue. Indeed, the Examiner was likely very focused on roller temperatures during his supplemental search, as that was the decisive issue (the "critical" issue according to Petitioner). (Pet., p. 15).

It is somewhat ironic for Petitioner to suggest that the Examiner erred by missing *Papermaking*, when apparently it is Petitioner who missed *Mohan*. Had Petitioner bothered to perform a roller-temperature search on the art listed on the face of the '142 Patent, perhaps Petitioner would have discovered *Mohan*, and spared all parties from the present undertaking.

Further to this point, in *Advanced Bionics*, the fact that the petitioner presented additional references that also disclosed the allowable feature that was disclosed in the reference already considered by the Office, was not enough to persuade the Board that the Examiner materially erred in determining the patentability of the challenged claims. (*Advanced Bionics*, Paper 6, p. 22). In the present case, the Board should similarly find that merely because *Papermaking*

happens to disclose a roller temperature of at least 250 °F that was also disclosed in the previously considered *Mohan* reference, is insufficient to find that the Examiner materially erred in determining patentability of the challenged claims.

Additionally, in *Panduit Corp. v. Corning Optical Communications LLC*, the Board determined that the petitioner’s unsupported conclusion regarding the Examiner’s error (that “[t]he only reasonable explanation for the Examiner’s failure . . . is that they misapprehended or overlooked the prior art’s teachings during prosecution”) was “not a meaningful identification of error by the Office.” (*Panduit*, IPR2021-01562, Paper 20, p. 17 (PTAB Apr. 6, 2022)). At bottom, Petitioner appears to have been unaware of the cumulative disclosure in *Mohan* when filing its Petition. The Board should thus follow its conclusion in *Panduit* and find that there was no meaningful identification of an error by the Office.

C. The Test Under *Becton, Dickinson*

To assist in applying the framework of *Advanced Bionics*, the Board has outlined a series of factors to weigh in determining whether or not to institute *inter partes* review. (See *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017)). The following numbered sections treat each of the six factors from *Becton, Dickinson* to show the overwhelming weight of the factors in Patent Owner’s favor. For each factor, the weight is in Patent

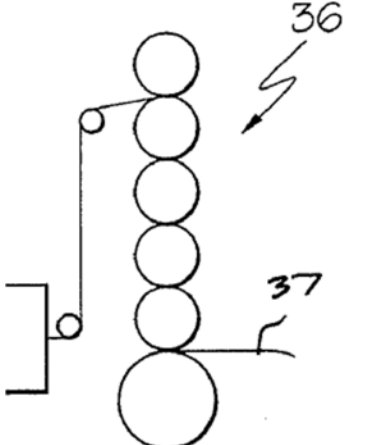
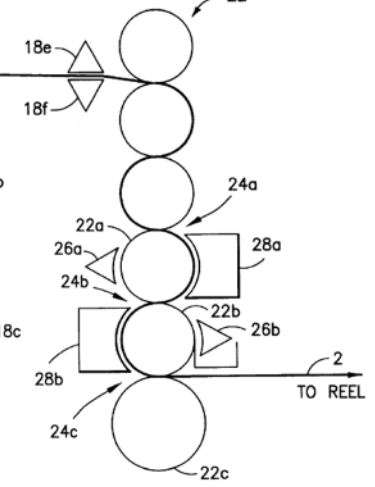
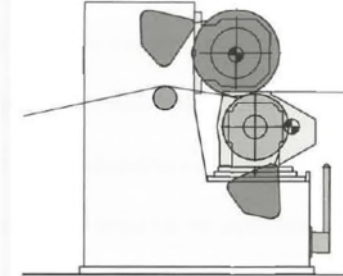
Owner's favor or else the factor is neutral. There are no factors weighing in favor of Petitioner.

1. Similarities and Material Differences Between the Asserted Art and the Prior Art Involved During Examination

Petitioner alleges there are material differences between the combination of prior art references asserted in the Petition and the single prior art rejection over *Fugitt* made during examination, specifically that the temperature of the thermo-roller was not considered in reviewing the prior art reference cited during prosecution. (Pet., p. 15). In this regard, Petitioner is contradicted by the Examiner's reasons for allowance in the Notice of Allowance, i.e., "that the cited prior art does not disclose a method for manufacturing a paperboard structure per steps claimed, the method including passing a paperboard substrate through a nip of a hot-hard calender, wherein the nip is defined by a thermo-roller and a counter roller, and wherein the contact surface of the thermo-roller is heated to an elevated temperature of at least 250 °F (claim 1)." (Ex. 1002, p. 103, emphasis added).

In addition to the Examiner's stated reasons for allowance above, it is also notable that the 250 °F calender stack in *Mohan* (see Ex. 2002, 4:45-57, and FIG. 2B, item 22) is more similar to the calender stack in *Fugitt* (see Ex. 1004, FIG. 11, item 36) than is the two-roll pre-calender nip of *Papermaking* (at page 86) from which Petitioner extracts the 200 °C roll temperature. This difference between *Mohan* and *Papermaking* weighs in Patent Owner's favor because the Examiner

had in his possession a stronger obviousness reference than *Papermaking*. Below is an annotation of the relevant portions of the rolls in *Fugitt*, *Mohan*, and *Papermaking*.

<i>Fugitt</i>, steam heated Dry Stack Calender Stack 36, <i>Fugitt</i> ¶[0026] and Fig. 11	<i>Mohan</i> 250-400 °F Multi-roll calender Stack, col. 4:23-57 and Fig. 2B.	<i>Papermaking</i> 200 °C two-roll pre-calender, Pages 38-39 and 82 and Fig. 22
		 Figure 22. Two-roll hard-nip calender.

In view of the foregoing, the similarities between *Mohan* and *Papermaking* weigh in favor of Patent Owner because *Mohan* includes the only thing for which Petitioner has cited *Papermaking*, namely a roll temperature of at least 250 °F. The material differences between *Mohan* and *Papermaking* weigh in favor of Patent Owner too, because *Mohan* was a more apt secondary reference to combine with *Fugitt* than *Papermaking*.

2. The Cumulative Nature of the Asserted Art and the Prior Art Evaluated During Examination

Petitioner has not commented on the cumulative nature of the asserted art, *Papermaking*, and the prior art evaluated during examination, *Mohan*, because apparently Petitioner was not aware of the existence of *Mohan* in the record or of its disclosure of a 250-400 °F multi-roll calender Stack. Patent Owner has already explained the highly cumulative nature of *Papermaking* to *Mohan*, namely that *Mohan* contains the only portion of *Papermaking* upon which Petitioner relies, a roller temperature of at least 250 °F. Therefore, the cumulative nature factor weighs in favor of Patent Owner.

3. The Extent to Which the Asserted Art Was Evaluated During Examination, including Whether the Prior Art Was the Basis of a Rejection

This third *Becton, Dickinson* factor appears to be neutral. Petitioner has not commented on this factor or its weight, beyond listing this factor with the other *Becton, Dickinson* factors. (Pet., pp. 13-14). In this case, *Papermaking* is the asserted art and *Mohan* is the prior art. Neither were applied by the Examiner in a rejection. In the arguments above, Patent Owner has shown how the Examiner evaluated the very “critical” (as alleged by Petitioner) issue of roller temperatures of at least 250 °F, how such roller temperatures were disclosed in *Mohan* and *Papermaking*, how the Examiner found Claim 1 patentable despite *Mohan*, and how *Mohan* and *Papermaking* could not ultimately be combined with *Fugitt* to

arrive at Claim 1. Therefore, if this factor has any weight at all in this case, it weighs in favor of Patent Owner. Petitioner certainly has not shown how this factor could weigh in Petitioner's favor.

4. The Extent of the Overlap Between Arguments Made During Examination and the Manner in Which Petitioner relies on the Prior Art

Petitioner indicated there is no overlap between the arguments made during examination and the manner in which Petitioner relies on the new prior art because *Fugitt* fails to specifically address a claim limitation (roller temperature) that the Examiner deemed critical to patentability. (Pet., p. 15). But there actually is considerable overlap in arguments about the roller temperature *because* the Examiner deemed the roller temperature critical to patentability. The Examiner deemed the roller temperature to be critical despite the fact that the Examiner had already acknowledged in rejecting original Claim 3 that the roller temperature was not disclosed in *Fugitt*. The only salient disclosure Petitioner extracts from *Papermaking* is the roller temperature, and Petitioner's argument admits that this roller temperature was already considered, nay, deemed critical by the Examiner. The overlap is all the more complete when considering that the temperature disclosed in *Papermaking* was already included in the cited reference, *Mohan*.

Abstracting roller temperatures from *Papermaking* or *Mohan* out of their context, combining them with *Fugitt* out of its context, and applying this

concoction against Claim 1 with disregard for the contextual elements recited in Claim 1 does not establish obviousness of the claim. The Examiner was correct. He considered the issue critical and realized that the roller temperature in the context of the other elements of Claim 1 is not obvious.

This factor weighs in favor of Patent Owner because the arguments in the Petition are so extensively overlapped with the arguments the Examiner made and reconsidered. This suggests *Papermaking* is cumulative art and the arguments relating thereto are cumulative to those made by the Examiner.

5. Whether Petitioner Has Pointed Out Sufficiently How the Examiner Erred in the Evaluation of the Asserted Prior Art

This factor is relevant specifically in cases where the Examiner actually evaluated the asserted prior art. In this case, it is established that the Examiner did not evaluate the asserted art, *Papermaking*. Therefore, this factor is of limited relevance to the present case.

The only Examiner error Petitioner has alleged is the Examiner not performing a supplemental search. Patent Owner has pointed out at length above, on pages 26-28 of this paper, multiple deficiencies in Petitioner's allegation. Since there was no error in the Examiner's evaluation of *Papermaking*, this is a factor that weighs in favor of Patent Owner if it has any weight at all in this case.

6. The Extent to Which Additional Evidence and Facts Presented in the Petition Warrant Reconsideration of the Prior Art or Arguments

There is no additional evidence and there are no additional facts presented in the Petition that warrant reconsideration of the prior art or arguments. Petitioner has made its position clear and consistent throughout the Petition: the Examiner allowed Claim 1 over *Fugitt* because *Fugitt* did not disclose a roller temperature of at least 250 °F, and *Papermaking* discloses a roller temperature of at least 250 °F. Petitioner has not pointed to any facts or evidence, including in its expert declaration, that deviate from the narrow ground that it would have been obvious to use the roller temperature of *Papermaking* in combination with *Fugitt*. Petitioner appears to believe that the mere existence of *Papermaking* and the other asserted art warrants reconsideration of the prior art and arguments. But in *Becton, Dickinson*, the Board held that the mere existence of the elements in the prior art did not warrant reconsideration of the prior art and arguments presented earlier to the Office. (*Becton, Dickinson*, Paper 8, pp. 25-28). So it is in this case. The mere fact that *Papermaking* discloses roller temperatures of at least 250 °F does not warrant reconsideration. This factor weighs in favor of Patent Owner.

D. The Reasoning Above Regarding *Papermaking* can readily be applied to the rest of the Asserted Art

The foregoing arguments have shown how the teaching relied upon in *Papermaking* is cumulative to the art cited by the Examiner, namely *Mohan*. In addition to *Papermaking*, Petitioner has also raised grounds of unpatentability using the other asserted art, namely *Gratton*, and *Papermaking II*. The following explains how the arguments provided above with respect to *Papermaking* can readily be applied to each of *Gratton* and *Papermaking II*.

With respect to *Gratton*, Patent Owner established above that the critical issue for which Petitioner relies upon *Papermaking* is teaching of a 200 °C (392 °F) roller temperature. (Ex. 1005, p. 82). Petitioner relies upon *Gratton* for the same critical issue, but in *Gratton* the roller temperature is 210 °C (410 °F). (Ex. 1006, FIG. 1). *Mohan* discloses a roller temperature of 250-400 °F. Since the roller temperature of 250 °F is Petitioner's reason for citing both *Gratton* and *Papermaking*, the same reasoning applied above with respect to *Papermaking* being cumulative to *Mohan*, can readily be applied *mutatis mutandis* to *Gratton*. (Ex. 2002, 4:54-56).

In addition to *Gratton* being cumulative to *Mohan*, there is no likelihood of success of Petitioner's unpatentability grounds based on *Gratton* because *Gratton* does not read on Claim 1 due to having too many rollers in the nip heated to an elevated temperature, as discussed further below in Ground 2. (*See infra*, §IV(C)).

With respect to *Papermaking II*, Petitioner only asserts this reference against dependent Claim 4 as relevant to application of starch. (Pet., pp. 65-6). Claim 4 depends upon Claim 1, and therefore includes the “at least over 250 °F” of underlying Claim 1. With respect to Claim 4, for the critical issue of roller temperature over 250 °F, Petitioner relies upon *Papermaking*, not *Papermaking II*. Since the roller temperature of 250 °F is Petitioner’s reason for citing *Papermaking* in asserting unpatentability of Claim 4 over *Fugitt*, *Papermaking*, and *Papermaking II*, the same reasoning applied above with respect to *Papermaking* being cumulative to *Mohan*, can readily be applied *mutatis mutandis* to Petitioner’s grounds of unpatentability of Claim 4 based on *Papermaking II*. (Ex. 2002, 4:54-56). There is no likelihood of success in Petitioner’s unpatentability grounds for Claim 4 based on *Fugitt*, *Papermaking*, and *Papermaking II* for the same reasons given above with respect to Claim 1 in view of *Papermaking*.

IV. RESPONSE TO PETITIONER’S DETAILED EXPLANATION UNDER 37 C.F.R. § 42.104(b)

A. Summary of the Art

1. Overview of *Fugitt*

Fugitt is a patent application about coatings for paperboard. *Fugitt* discloses a method for coating dry finish paperboard. (See generally, Ex. 1004). *Fugitt* explains the relationship between basis weight and density determines stiffness, i.e., that generally stiffness increases with basis weight. (*Id.* at [0003]-[0005]).

However, increasing basis weight means adding fiber material, which adds to cost. (*Id.*). Thus, in order to increase stiffness without increasing the basis weight, density can be reduced. (*Id.*). One objective in *Fugitt* is to reduce density loss, expressed as avoiding reduction in caliper thickness, to maintain stiffness without the increased cost of adding fiber to achieve stiffness through increasing basis weight. (*Id.* at [0026]). Another objective in *Fugitt* is to provide surface smoothness. (*Id.* at [0005]).

Smoothness and stiffness are both desirable for printing. (Ex. 2003, ¶69). Smoothness allows for high resolution printing. (*Id.*). Normally, smoothness is achieved by reducing caliper thickness, i.e., by compacting the paperboard as in newsprint and glossy paper used for books. (*Id.*). However, compacting paperboard makes the paperboard less stiff. (*Id.*). Flimsy paperboard tends to foul paperboard printers. (*Id.*). Therefore, in *Fugitt*, the goal is to improve smoothness without sacrificing stiffness by using coatings on the paperboard surface. (Ex. 1004, [0005]). *Fugitt* does not provide a numerical range of nip loads beyond an indication that nip loads and number of nips in the steam headed calender can be reduced. (*Id.* at [0026]).

Fugitt paragraph [0025] indicates the use of a dry stack calender instead of a wet stack calender, and paragraph [0026] indicates the rolls of the dry stack calender can be steam heated. (Ex. 2003, ¶70). That being said, *Fugitt* is primarily

a document about coatings, whereas the '142 Patent is more about calendering.

(*Id.*). Despite this difference, what seems to have attracted the attention of the Examiner to *Fugitt*, and also the interest of Petitioner, is Example 3 in *Fugitt*. (*Id.*). Example 3 is the only place in *Fugitt* (or in any of the prior art) where there is an example of a paperboard structure that falls under the Y_2 curve of Claim 1 of the '142 Patent. (*Id.*).

On its face, Example 3 of *Fugitt* discloses a paperboard structure with a PPS 10S smoothness of 1.5 microns which is in the sub 3 micron range for PPS 10S smoothness of Claim 1, and that falls under the Y_2 curve for basis weight in Claim 1. (Ex. 2003, ¶71). Equation 1 in Claim 1 of the '142 Patent is: $Y_2 = 3.71 + 13.14X - 0.1602X^2$, and in the case of Example 3 in *Fugitt*, $X = 12$ so $Y_2 = 138.3$, where the units of Y_2 are lbs/3000 ft². (*Id.*). Claim 1 recites that the paperboard structure has a basis weight at most Y_2 , so for *Fugitt* to read on Claim 1, *Fugitt* needs a paperboard with a basis weight below 138.3. (*Id.* at ¶72). The paperboard structure in Example 3 of *Fugitt* has a stated basis weight of 130.0 lbs/3000 ft², which is less than 138.3 lbs/3000 ft². (*Id.*). Therefore, on its face, Example 3 of *Fugitt* falls under the Y_2 curve of Claim 1. (*Id.*).

2. Overview of *Papermaking*

Papermaking is a Finnish textbook or handbook-style treatise in English from 2010 (within a year of the publication of *Fugitt*), published as an update to an

earlier edition from 1998-2000. (*See* Ex. 1005, pp. 2-3). The chapter of *Papermaking* that the Petition relies upon is organized in relevant part as follows. First there is an overview of calendering, the process of compressing a web of paper during its manufacture. (*See*, Ex. 1005, pp. 14-35). Then there is an explanation of different kinds of *Papermaking* calenders. (*Id.* at pp. 35-67). There is an explanation of applications for calendering, wherein various types of paper products are discussed with respect to the types of calenders used for making the same. (*Id.* at pp. 67-99). Finally, the relevant chapter of *Papermaking* ends with a discussion of construction consideration for making the various types of calenders. (*Id.* at pp. 84-99).

Papermaking describes various types of calenders. (*Id.* at pp. 35-67).

Papermaking lists calendering methods for various applications for calenders including: newsprint, SC paper, coated wood containing paper grades, woodfree uncoated papers, woodfree coated papers, containerboards, uncoated liquid packaging board, and release and coated label paper. (*Id.* at pp. 67-84).

Papermaking lists consideration for construction of various types of calenders at pages 84-99.

3. Overview of *Gratton*

Gratton is a January 1988 article in the Technical Association of the Pulp & Paper Industry, Inc. (“TAPPI”) Journal. It compares temperature gradient (“TG”)

calendering at 210 °C with more conventional calendering at 50 °C. (Ex. 1006, p. 82). In both cases, both rolls were heated to the same temperature. (Ex. 1006, Fig. 1). That is to say, in the 210 °C case, both rolls were heated to 210 °C, so the paper web was heated on both sides. (*Id.* at p. 82). There is no thermo-roller versus counter roller in *Gratton* as there is in the '142 Patent. *Gratton* is a research paper typical of the research work referred to in *Papermaking*, “[h]eating up both nip rolls, however, is complicated because the other roll is a deflection-compensated roll. Because of the benefits of soft-calender technology, this kind of calendering has remained very rare in spite of the amount of research work done.” (*See* Ex. 1005, p. 40).

It appears that the authors of *Gratton* believed their innovation was to reduce the number of nips the web had to pass through by heating the one nip in the TG calendering to 210 °C, to obtain better final properties, i.e., the roller temperature and the number of nips appear to be the only meaningful difference between TG and conventional calendering. (Ex. 1006, p. 86). Notably, the nip loads used in both TG and conventional calendering were in the same range, i.e., 20, 40, 60, 80, and 100 kN/m. (*Id.*) Both *Fugitt* and the '142 patent seriously outclass *Gratton* where the examples are for a much thicker, heavier, rougher paperboard. In the foregoing metrics, *Fugitt* and the '142 Patent both outclass *Gratton* by so great a margin, it suggests that *Gratton* is not a likely source from which one of ordinary

skill in the art would draw to try to improve over *Fugitt* to arrive at what is claimed in the '142 Patent. (Ex. 2003, ¶79).

4. Overview of *Papermaking II*

Papermaking II is an excerpt dated to 2000 from the same series of books as *Papermaking*. The excerpt relates to board coating for containerboard and linerboard, and includes mention of carrier board, liquid board, boxboard, and solid bleached sulphate (“SBS”). (See generally Ex. 1007). The first paragraph of Section 2.1 indicates there is a size press before coating, and states that low-consistency starch is applied on the board surface in association with the size press. (Ex. 1007, p. 583).

5. Overview of *Mohan*

Mohan was granted as U.S. Patent No. 6,274, 001 on August 14, 2001 to inventor K. Krishna Mohan and Assignee International Paper Company of Purchase, New York. *Mohan* is cited on the face of the '142 Patent and is discussed herein because it is cumulative to the asserted art *Papermaking*, *Gratton*, and *Papermaking II*. (Ex. 2003, ¶82). *Mohan* describes a calendering method which enhances the smoothness for paper/paperboard by a combination of temperature and moisture gradient calendering. (See Ex. 2001, Abstract). Of particular relevance is the second multi-roll calender stack 22, shown in Fig. 2B of *Mohan*. (See *id.* at 4:23-45). *Mohan* teaches that the heated rolls of the calender

stack 22 can be heated to a roll surface temperature of 250-400 °F, and that these temperatures can be attained by induction heaters, internal steam, oil, or other heating fluids, or using internal induction coils. (*Id.* at 4:45-57). *Mohan* describes modifications for smoothening one or both sides of a paper web. (*Id.* at 5:41-55). The nip loads contemplated in *Mohan* range from 100 to 1500 pli. (*Id.* at 5:64-65).

B. Ground 1: Claims 1, 2, and 5-23 are patentable over *Fugitt* in view of *Papermaking* and *Mohan*

a. Claim 1

Petitioner contends *Fugitt* discloses hot-hard calendering because the dry stack calender 36 in *Fugitt* may be steam heated. (Pet., pp. 30-31; *see also* Ex. 1004, [0026]). Based on the proper construction of the claim term “hot-hard calender” outlined herein, *Fugitt* does not disclose hot-hard calendering because *Fugitt* states that the rolls (plural) of the calender may be steam heated. (Ex. 1004, [0026])). There is nothing in *Fugitt* that suggests only one of the rolls is heated.

Petitioner argues that *Fugitt* discloses a thermo-roller, and indicates the roller arranged opposite the thermo-roller in *Fugitt*’s dry stack calender acts as a counter roller. (Pet., p. 31). Patent Owner disagrees to the extent that Petitioner is implying the counter-roller in *Fugitt* is not heated. It is heated, because as pointed out above *Fugitt* indicates the rolls (plural) can be heated. (Ex. 1004, [0026]).

Fugitt and *Papermaking* fail to disclose a hot-hard calender as recited in Claim 1. (Ex. 2003, ¶89). This means there cannot be a *prima facie* case of

obviousness with respect to the combination of *Fugitt* and *Papermaking*. Petitioner has not met its burden of setting forth a *prima facie* case as to whether the supposed hot-hard calender is taken from *Fugitt* or from *Papermaking*, or exactly how Petitioner believes *Papermaking* and *Fugitt* combine to account for each and every element recited in Claim 1.

This leaves Patent Owner and the Board having to give benefit of the doubt as to what exactly the supposed ground for obviousness of Claim 1 is based on in *Fugitt* and *Papermaking*. Patent Owner assumes, *arguendo*, that Petitioner intended to rely upon *Fugitt* for all of the elements of Claim 1 except for the contact surface of the thermo-roller being heated to an elevated temperature of at least 250° F, and for this one element of Claim 1 that *Fugitt* is missing, Petitioner is citing *Papermaking* to fill in the gap. Specifically, Petitioner cites to *Papermaking* at page 82 (which gives a roller temperature of 200° C, 392° F) and page 98 (which gives a roller temperature of 220° C, 428 °F). (Ex. 1005, pp. 82; Ex. 1010, p. 98).

Further assuming, *arguendo*, that Petitioner is arguing it would be obvious to raise the roller temperatures in the *Fugitt* process to the 392-428 °F levels stated on page 82 and page 98 of *Papermaking*, Patent Owner submits that it would *not* have been obvious to use calender roll temperatures of 392-428 °F in the *Fugitt* process to arrive at the paperboard product recited in Claim 1, regardless of

whether the roller temperature teaching is abstracted from *Papermaking*. (Ex. 2003, ¶91).

The temperature of at least 250° F recited in Claim 1 is only one part of the full context of what is recited in Claim 1. (Ex. 2003, ¶92). Also recited in Claim 1 is a paperboard structure with a Parker Print Surf (PPS 10S) smoothness being at most 3 microns, and a polynomial relationship between basis weight Y_2 as a function of caliper thickness X . (Ex. 1001, 12:32-53). It is not to be expected that simply turning up the temperature in the calender stack of *Fugitt* to the 392-428 °F temperatures disclosed in *Papermaking* would result in a paperboard structure having the smoothness together with the relationship of basis weight Y_2 as a function of caliper thickness as recited in Claim 1. (*See, e.g.*, Ex. 2003, ¶92).

In fact, as pointed out by Petitioner, the paperboard products disclosed in *Fugitt* attained the smoothness and basis weight Y_2 as a function of caliper thickness as is, i.e., without the modification of raising the roller surface temperatures up to 392-428 °F as stated in *Papermaking* or *Mohan*. (Pet., pp. 35-36). Turning up the heat in the *Fugitt* process to temperatures as high as 392-428 °F would have overshoot the basis weight Y_2 as a function of caliper thickness recited in Claim 1, meaning the resulting paperboard product would fail to reach the area below the Y_2 curve recited in Claim 1. (*See* Ex. 2003, ¶93). Petitioner's proposed combination of the method in *Fugitt* and the temperatures in

Papermaking would have overheated and/or over-compressed the paperboard product to be inferior in terms of the basis weight as a function of caliper thickness—inferior both to what is recited in Claim 1, and to what was listed in Example 3 of *Fugitt*. (*Id.*). This effect is exacerbated by the fact that the calender 36 in *Fugitt* is a calender stack that ultimately heats the paper web on both sides. (Ex. 1004, [0026] and Fig. 11). Heating both sides of the paper web in *Fugitt* to at least 392-428° F would lead to an undesirable loss of bulk on both sides of the web. (Ex. 2003, ¶93).

Those having ordinary skill in the papermaking art are aware of the many factors that go into creating a specific paper product. Some of these factors include nip loading, i.e., how much force is applied to press the paper web passing between two rollers, how many nips to pass the web through, temperatures of the rollers in any calenders, additives such as starch used in the sizing rollers, whether moisture is added in the calendering process, what kind of coatings to apply, and the like. (Ex. 2003, ¶94). If one of ordinary skill in the art desires to change one of these factors, e.g., the roller temperature in the *Fugitt* process, that person knows that such an alteration could completely change the paper product coming out of the process. (*Id.*). One change, such as changing the roller temperature, can lead to a cascade of other changes needed to avoid unwanted effects on the paper product

output. (*Id.*). For these reasons, it would not be obvious to merely change the roller temperature in *Fugitt* as Petitioner has alleged.

Modifying the roller temperature in the *Fugitt* process to the levels disclosed on pages 82 and 89 of *Papermaking* would have reduced the caliper thickness, rendering the *Fugitt* paper product inferior to what was actually disclosed in *Fugitt*. (*Id.* at ¶95). The alternative to losing this caliper thickness would have required any number of other changes in the *Fugitt* system to try to compensate for the negative effects of the increased roller temperature, which other changes Petitioner has not explained. (*Id.*). Such other changes, if proposed, would be made with reliance upon impermissible hindsight reasoning taking into account information gleaned only from the '142 Patent itself.

Another reason it would not be obvious to one of ordinary skill in the art to turn up the temperature in the *Fugitt* process is because doing so would be costly. (Ex. 2003, ¶96). The energy costs of using temperatures as high as those taught in *Papermaking* would have been considerably higher than the energy costs in the unmodified process of *Fugitt*. (*Id.*). Therefore, Petitioner's proposed combination would significantly increase production costs in order to yield an inferior paperboard product to what the unmodified system in *Fugitt* could attain. (*Id.*). The combination of *Fugitt* with *Papermaking* would not be an obvious alteration for one of ordinary skill in the art, nor would it be an obvious thing to try. (*Id.*). The

Examiner apparently appreciated in view of the totality of the art, and the full context of Claim 1, that it is not feasible to simply take a roller temperature out of context, e.g., from *Papermaking* or the traditional papermaking processes the Examiner cited in the rejection of original Claim 3, to modify *Fugitt* in the manner suggested by Petitioner. (*Id.*). The same reasoning can readily be applied to *Mohan*. It would not have been obvious to use the 250-400 °F temperature disclosed in *Mohan* for the process described in *Fugitt* for the same reasons given above with respect to *Papermaking*. (*Id.*).

In addition to proposing to simply change the roller temperature in *Fugitt*, Petitioner makes a passing mention of a substitution of the single heated hard nip calender in *Papermaking* for the calender stack in *Fugitt*. (Pet., p. 37-38). Even if one were to consider combining the one-nip heated calender of page 82 of *Papermaking* to replace the calender stack in *Fugitt*, there are problems with the combination. (Ex. 2003, ¶97). The single nip heated calender on *Papermaking* page 82 is only one of several options listed, and according to Figure 63 on page 81 of *Papermaking*, it does not obtain the benefits of hot soft nip or metal belt calendering. (See Ex. 1005, pp. 81-82, where the upper right corner in the chart of Fig. 63 shows better bulk/smoothness quality). Moreover, the pre-calendering section 4.4.2 of *Papermaking* does not provide any specific examples of bulk (caliper thickness and weight) or smoothness, so Petitioner has not met its burden

of proof that substituting the single nip heated pre-calender from Section 4.4.2 of *Papermaking* for the calender stack in *Fugitt* would still provide a paperboard structure meeting the smoothness and caliper/basis weight equation recited in Claim 1. (Ex. 2003, ¶97).

The Zotterman Declaration at ¶ 111 alleges that the temperature in Claim 1 is a matter of routine optimization. (Ex. 2003, ¶98). But Zotterman has isolated the temperature of 250 °F out of the context of the rest of the elements of Claim 1, ignoring the Y₂ curve recited in Claim 1. (*Id.* at ¶98). Patent Owner has already laid out that one cannot simply change the temperature without having other effects on the system. But there is another issue: modifying the process in *Fugitt* to run at over 250 °F, one must still attain a paperboard structure with properties under the Y₂ curve as recited in Claim 1. (*Id.*). Petitioner and Zotterman have not shown that altering the temperature in *Fugitt* would still result in properties under the Y₂ curve as recited in Claim 1. (*Id.*). At its face value, Example 3 of *Fugitt* describes a process resulting in a paperboard structure that has properties below the Y₂ curve of Claim 1. (*Id.*). However, significantly increasing the temperature used in that *Fugitt* process as proposed by Petitioner and Zotterman would alter the properties of the Example 3 paperboard structure in *Fugitt*, reducing its bulk and placing it above the Y₂ curve and outside the scope of Claim 1, and the burden is on Petitioner to show otherwise. They have not done so. (*See, e.g.*, Ex. 2003, ¶98).

The foregoing demonstrates that *Fugitt* and *Papermaking* would not have rendered Claim 1 obvious to one of ordinary skill in the art at the time of filing the application for the '142 Patent. Since *Mohan* is cumulative to *Papermaking* with respect to the temperature issue, *Fugitt* and *Mohan* would not have rendered Claim 1 obvious to one of ordinary skill in the art at the time of filing the application for the '142 Patent. And since the combination of *Fugitt* with *Papermaking* or *Mohan* would not have rendered Claim 1 obvious, Petitioner's Ground 1 fails. Claim 1 is therefore patentable over *Fugitt*, *Papermaking*, and *Mohan*.

b. Claim 2

Claim 2 depends from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 2. In addition, there are the following inadequacies in the Petition with respect to Claim 2.

The Petition indicates 10 to 40 kN/m converts to 3.5 to 88 pli. This is an incorrect unit conversion, and it should be stated that 10 to 40 kN/m converts into 57.1 to 228.6 pli, because $3.5 \text{ kN/m} = 20 \text{ pli}$. Petitioner's conversion error is also in the Zotterman Declaration at ¶119. (Ex. 1003, ¶119). Claim 2 recites a nip load ranging from about 20 pli to about 500 pli. (See Ex. 1001, Claim 2). With the correct unit conversion in mind, *Papermaking* discloses nip loads ranging from 57.1 to 228.6 pli, which is not stated as being particularly relevant to cartonboard. (See Ex. 1005, p. 72). (Ex. 2003, ¶105). Additionally, *Papermaking* gives a nip

load value that can be exceeded (571 pli) on page 82, which may be relevant to cartonboard, but this is wholly outside the range recited in Claim 2. (*Id.*).

Petitioner has cherry picked numerical values from *Papermaking* out of context and has made unit conversion errors in its own favor. (*Id.* at ¶106). In view of the foregoing, and in addition to the reasons already given above with respect to Claim 1, *Fugitt*, *Papermaking*, and *Mohan* do not render Claim 2 obvious. Claim 2 is therefore patentable over *Fugitt*, *Papermaking*, and *Mohan*.

c. Claim 5

Claim 5 depends from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 5.

However, it should be noted that as the number of rollers and nips is implicated in Claim 5, Petitioner cannot apply to Claim 5 the version of its argument where the calender stack in *Fugitt* is simply raised to over 250 °F. (Ex. 2003, ¶111). This is because too many rolls are heated to an elevated temperature in *Fugitt* when the claim terms are properly construed to have only one roller heated to the elevated temperature. (*Id.*). Petitioner also cannot apply the version of its argument where the two-roll calender from *Papermaking* replaces the calender stack in *Fugitt* because the two-roll calender in *Papermaking* only has two rolls, not three as recited in Claim 5. (*Id.*).

In view of the foregoing, and in addition to the reasons already given above with respect to Claim 1, *Fugitt, Papermaking*, and *Mohan* do not render Claim 5 obvious. Claim 5 is therefore patentable over *Fugitt, Papermaking*, and *Mohan*.

d. Claims 6-14 and 16-22

Claims 6-14 and 16-22 each depend from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claims 6-14 and 16-22. Each of Claims 6-14 and 16-22 is patentable over *Fugitt, Papermaking*, and *Mohan*.

e. Claim 15

Claim 15 depends from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 15. In addition, Petitioner relies upon *Fugitt*, [0044], which disclosed 50:50 clay to calcium carbonate, but Petitioner has not met its burden of explaining how this number correlates to the range of 10-60 percent ground calcium carbonate by weight, as recited in Claim 15. (Pet., Pp. 47-48). There is no stated *prima facie* case of obviousness in the Petition for Claim 15. Claim 15 would not have been obvious to one having ordinary skill in the art in view of *Fugitt, Papermaking*, and *Mohan*. Claim 15 is therefore patentable over *Fugitt, Papermaking*, and *Mohan*.

f. Claim 23

Claim 23 depends from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 23. In addition, the Petition cites

to Example 3 in *Fugitt*, which yielded a paper produce with a caliper thickness of 12 points. (Pet., pp. 53-54). Calculating the value of Y_3' in Claim 23 using 12 basis points as the value for X yields 128.7. But Example 3 in *Fugitt* yielded a basis weight of 130.0, which is greater than 128.7 and therefore lies outside the range recited in Claim 23. (Ex. 1004, [0057]). In order to lower the basis weight of *Fugitt* Example 3, Petitioner has arbitrarily added 1.6% to the caliper points, which appears to be the epitome of hindsight reasoning, and to defeat the claim differentiation to which Patent Owner is entitled among Claims 1, 21, 22, and 23. (See *Phillips*, 415 F.3d at 1315 (Fed. Cir. 2005). There is a similar problem in the Zotterman Declaration, where Zotterman attempts to bring in a folding boxboard (“FBB”) example discussed in *Papermaking*, deriving 2.0 PPS s10 smoothness and bulk of 1.7 cm³/g. (Ex. 1003, p. 56). Zotterman associates a caliper of 14.2 points to this FBB example, but never cites any source for that 14.2 points figure, and it is not in *Papermaking* Fig. 62 or the associated text. (Ex. 2003, ¶130). It cannot therefore be given any weight. In view of the foregoing, Claim 23 would not have been obvious to one having ordinary skill in the art in view of *Fugitt*, *Papermaking*, and *Mohan*. Claim 23 is therefore patentable over *Fugitt*, *Papermaking*, and *Mohan*.

C. Ground 2: Claims 1, 2, and 4 are Patentable under 35 U.S.C. § 103 over *Fugitt* in view of *Papermaking*, *Gratton*, and *Mohan*

a. Claim 1

The deficiencies in the combination of *Fugitt* and *Papermaking* with respect to Claim 1 have already been established above with respect to Grounds 1. *Gratton* does not remedy the deficiencies in disclosure in the combination of *Fugitt* and *Papermaking*. Patent Owner pointed out above that properly construed, the counter-roller or rollers in Claim 1 are not heated to the elevated temperature. In *Gratton*, both rollers are heated to an identical temperature. (Ex, 1006, Fig. 1; p. 86).

Petitioner uses *Gratton* for its teaching of a roller temperature of 210 °C, which is cumulative to the teachings of *Papermaking* itself. (Ex. 2003, ¶137). Patent Owner pointed out above that the temperature cannot simply be extracted from *Papermaking* and injected into *Fugitt* without reference to the equation in Claim 1, and the same applies to *Gratton*. The unmodified version of *Fugitt* (Example 3) already achieved a paperboard product having the Y₂ equation's quality. (*Id.*). Petitioner has not provided any evidence that a product having the same quality would be possible if *Fugitt* is modified with the extra heat in the combination of *Papermaking* and *Gratton*. (*Id.*). Where Claim 1 and *Fugitt* both outclass *Gratton* on every metric, it would not be obvious to modify *Fugitt* with *Gratton* in the manner suggested by Petitioner because the extra heat would downgrade the paperboard structure of *Fugitt* Example 3 out of the Y2 area of

Claim 1. (*Id.*). This would all be in a hindsight driven attempt to arrive at a product in league with *Fugitt* and the equation in Claim 1. (*Id.*)

There is an additional problem with *Gratton*. (Ex. 2003, ¶138). Petitioner and Zotterman argue that the calender 36 in *Fugitt* relates to pre-calendering, before application of the basecoat and topcoat recited in Claim 1. (Pet., pp. 64-65; Ex. 1003, pp. 65-66, ¶¶ 185-186. However, *Gratton* describes the coating of pigmented starch as occurring in a size press, which Zotterman has declared would of necessity be upstream of the heated rollers shown in Fig. 1 of *Gratton*. (See Ex. 1006, p. 86; Ex. 1003, ¶¶ 185-186). The fact that *Gratton* refers to coating before and not after the heated nip, means the heated rolls in *Gratton* are not for pre-calendering. (Ex. 2003, ¶138). This argues against the combination of *Fugitt* and *Gratton* wherein Petitioner supposes the post-coating heated nip of *Gratton* could be substituted for the pre-coating calender stack in *Fugitt*. (Ex. 2003, ¶138).

Gratton is a research paper typical of the research work referred to in *Papermaking*, “[h]eating up both nip rolls, however, is complicated because the other roll is a deflection-compensated roll. Because of the benefits of soft-calender technology, this kind of calendering has remained very rare in spite of the amount of research work done.” (See Ex. 1005, p. 40). Given the level of one of ordinary skill in the art, it would not have been obvious to use the two-heated rollers of *Gratton* in any practical setting, let alone in combination with *Papermaking* and

Fugitt. (Ex. 2003, ¶139). This is especially true since *Papermaking* teaches away from that combination by associating the very rare two-heated-rolls technique of *Gratton* with complications and research work. (*Id.*). *Papermaking* clearly teaches instead toward use of soft calendering. (*Id.*) One of ordinary skill in the art possessing copies of *Fugitt*, *Papermaking*, and *Gratton* would ignore the teaching of *Gratton* and follow the suggestion in *Papermaking* to use a soft calendering technique, which is not relevant to Claim 1. (*Id.*).

With respect to *Mohan*, Patent Owner already discussed this reference in combination with *Papermaking* above. The same reasoning provided in the grounds above also apply here to the grounds based on *Gratton*. In view of the foregoing, Claim 1 is not obvious over *Fugitt*, *Papermaking*, *Mohan*, and *Gratton*. Accordingly, Claim 1 is patentable over *Fugitt*, *Papermaking*, *Gratton*, and *Mohan*.

b. Claims 2 and 4

Claims 2 and 4 each depend from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 2. In view of the foregoing, Claims 2 and 4 are not obvious over *Fugitt*, *Papermaking*, and *Gratton*. Claims 2-4 are each therefore patentable over *Fugitt*, *Papermaking*, *Gratton*, and *Mohan*.

D. Ground 3: Claim 4 is Patentable Under 35 U.S.C. § 103 over *Fugitt* in view of *Papermaking*, *Papermaking II*, and *Mohan*

a. Claim 4

Claim 4 depends from Claim 1, and therefore the same arguments provided above with respect to Claim 1 also apply to Claim 4. Specifically, under Ground 1 above, the deficiencies of the combinations of *Fugitt*, *Mohan*, *Gratton*, and *Papermaking* with respect to Claim 1 have already been addressed. *Papermaking II* does not even discuss the at least 250 °F temperature range in Claim 1, nor has Petitioner alleged anything about *Papermaking II* and temperature. (See Pet., pp. 66-67). *Papermaking II* does not remedy the deficiencies of the combination of *Fugitt* and *Papermaking* with respect to Claim 1. Therefore, the combination of *Fugitt*, *Papermaking*, *Mohan*, *Gratton*, and *Papermaking II* does not render independent Claim 1 obvious. For at least the same reasons, dependent Claim 4 is not obvious over *Fugitt*, *Papermaking*, *Mohan*, *Gratton*, and *Papermaking II*, and is therefore patentable over *Fugitt*, *Papermaking*, *Mohan*, *Gratton*, and *Papermaking II*.

V. CONCLUSION

Patent Owner submits that the asserted art is cumulative to the cited art already considered by the Examiner, the asserted arguments are cumulative to those already before the Examiner, and Petitioner has not sufficiently set forth any material error by the Examiner. Patent Owner also submits that there is no reasonable likelihood that Petitioner will prevail on the challenged claims because

the challenged claims are patentable over the asserted art for the reasons set forth above. For the foregoing reasons, Patent owner respectfully requests that the Board exercise its discretion and decline to institute review of the Challenged Claims.

Dated: December 21, 2023

Respectfully submitted,

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CERTIFICATION OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Preliminary Response includes 13,738 words, as counted by the word processor used to prepare this Response, and is therefore in compliance with the 14,000 word limit established by 37 C.F.R. § 42.24(b)(1). Accordingly, pursuant to 37 C.F.R. § 42.24(d), lead counsel for Patent Owner hereby certifies that this paper complies with the type-volume limits established for a patent owner preliminary response petition.

Dated: December 21, 2023

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §42.6(e) and 37 C.F.R. §42.105(b), the undersigned hereby certifies that on December 21, 2023, a complete copy of the foregoing **Patent Owner's Preliminary Response** was served in its entirety on Petitioner's below-listed counsel of record via electronic mail at: richard.myers@stites.com.

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