

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TC HEARTLAND LLC,
Petitioner,

v.

KRAFT FOODS GROUP BRANDS LLC,
Patent Owner.

Case IPR2015-01131
Patent 8,603,557 B2

Before TONI R. SCHEINER, HYUN J. JUNG, and
SUSAN L. C. MITCHELL, *Administrative Patent Judges*.

SCHEINER, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318 and 37 C.F.R. § 42.73

I. INTRODUCTION

This is a final written decision in an *inter partes* review of claims 1–29 of U.S. Patent No. 8,603,557 B2 (Ex. 1001, “the ’557 patent”). TC Heartland LLC (“Petitioner”) filed a Petition (Paper 1, “Pet.”) on April 29, 2015, requesting an *inter partes* review of claims 1–29 of U.S. Patent No. 8,603,557 B2 (Ex. 1001, “the ’557 patent”). Kraft Foods Group Brands LLC (“Patent Owner”) filed a Preliminary Response (Paper 6, “Prelim. Resp.”) on August 5, 2015. On November 4, 2015, we instituted trial on the following ground: Claim 1–29 of the ’557 patent under 35 U.S.C. § 103(a) as unpatentable over Lohrman¹ and Ackilli.² Paper 7, Instit. Dec. 25.

Subsequently, Patent Owner filed a Response (Paper 26, “PO Resp.”), and Petitioner filed a Reply (Paper 38, “Reply”).

Petitioner filed a Motion to Exclude (Paper 43) certain portions of Dr. Marvin J. Rudolph’s Declaration (Exhibit 2012) as not based on any knowledge or experience of Dr. Rudolph. Paper 43, 1. Patent Owner filed an Opposition to the Motion to Exclude (Paper 50), and Petitioner filed a Reply (Paper 58).

Patent Owner filed a Motion to Exclude (Paper 45) certain portions of Mr. Ackilli’s Declaration (Ex. 1202) as outside of the proper scope of reply

¹ Richard D. Lohrman *et al.*, U.S. Patent No. 5,632,420, issued May 27, 1997 (Ex. 1004).

² Joseph A. Ackilli *et al.*, WO 2006/102435 A2, pub. Sept. 28, 2006 (Ex. 1005).

evidence or as presenting irrelevant information. Paper 45, 1. Patent Owner also moves to exclude a paragraph of Dr. Robert M. Kimmel’s Second Declaration (Ex. 1212) and the LaFlamme reference (Ex. 1216) as beyond the proper scope of reply evidence. *Id.* at 1, 14–15. Petitioner filed an Opposition to the Motion to Exclude (Paper 52), and Patent Owner filed a Reply (Paper 59).³

A final hearing was conducted on August 2, 2016. Paper 61 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6. Petitioner bears the burden of proving unpatentability of the challenged claims, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must establish facts supporting its challenge by a preponderance of the evidence. *See* 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

For the reasons that follow, we determine that Petitioner has not demonstrated by a preponderance of evidence that claims 1–29 (“The challenged claims”) are unpatentable on the instituted ground.

³ Petitioner and Patent Owner also filed Objections to Evidence, *see* Papers 14, 15, 32, 42, and Patent Owner filed Observations regarding the Cross-Examination of Joseph Ackilli and Dr. Kimmel to which Petitioner filed responses, *see* Papers 46, 47, 51, 56. We have reviewed these papers and will give the evidence the appropriate weight in light of these observations and objections.

A. Related Proceedings

Patent Owner filed suit against Petitioner, alleging infringement of the '557 patent in *Kraft Foods Group Brands LLC v. TC Heartland LLC*, No. 14-128 (D. Del.). Pet. 1; Paper 5, 2. In addition, concurrently with the Petition under consideration here, Petitioner has filed Petitions challenging the claims of related U.S. Patent Nos. 8,293,299 B2 and 8,511,472 B2. IPR2015-01128, IPR2015-01129, respectively. *See id.*

C. The '557 Patent (Ex. 1001)

The '557 patent, titled “Containers and Methods for Dispensing Multiple Doses of a Concentrated Liquid, and Shelf Stable Concentrated Liquids,” discloses a flavored liquid beverage concentrate, disposed in a container designed to dispense a jet of concentrate when squeezed (Ex. 1001, 2:27–37). Figure 2 of the '557 patent is reproduced below.

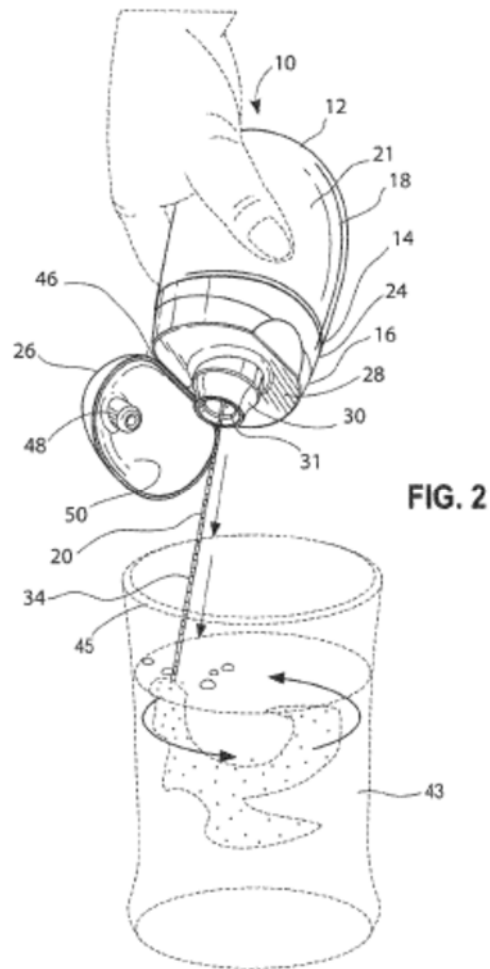


Figure 2 is a schematic perspective view of container 10 of the '557 patent being squeezed to dispense a jet of liquid. *Id.* at 5:22–24. “[S]pout 30 includes a nozzle 32 disposed therein, such as across the fluid flow path, that is configured to restrict fluid flow from the container 10 to form a jet 34 of liquid concentrate 20.” Ex. 1001, 7:34–37.

Figure 4 of the '557 patent is reproduced below.

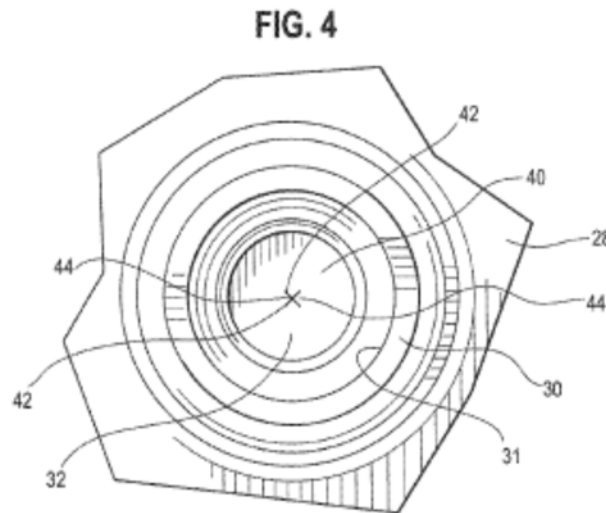


Figure 4 of the '557 patent is a top plan view of spout 30 and nozzle 32 of container 10. Ex. 1001, 5:27–28.

[N]ozzle 32 includes a generally flat, flexible plate 40, which may be composed of silicone or the like, having a plurality of slits 42 therein, and preferably two intersecting slits 42 forming four generally triangular flaps 44. So configured, when the container 10 is squeezed, such as by depressing the sidewall 18 at the recess 22, the liquid concentrate 20 is forced against the nozzle 32 which outwardly displaces the flaps 44 to allow the liquid concentrate 20 to flow therethrough. The jet 34 of liquid concentrate formed by the nozzle 32 combines velocity and mass flow to impact a target liquid 43 [.]

Id. at 7:41–52.

The beverage concentrates disclosed by the '557 patent comprise artificial and/or natural flavorings, used alone or in various combinations. Ex. 1001, 21:30–32, 22:29. The '557 patent discloses that “a shelf stable liquid concentrate can be provided by including one or more acidulants in an amount effective to provide a pH of less than 3.0 and by including about 3 to

35 percent alcohol by weight.” *Id.* at 21:33–36. “In another aspect,” the ’557 patent discloses that “a shelf stable liquid concentrate can be provided with a pH of less than 3.0 and substantially no alcohol . . . [by] includ[ing] buffers.” *Id.* at 21:39–42. “By ‘shelf stable’ it is meant that the concentrate avoids substantial flavor degradation and is microbially stable . . . for at least about three months.” *Id.* at 21:60–65.

The acidulant included in the concentrate can include . . . any edible, food grade organic or inorganic acid, such as . . . citric acid, . . . phosphoric acid, lactic acid, and the like. . . . The pH range of the concentrate can be from about 3.5 to about 1.4, in another aspect from about 3.0 to about 1.4, and preferably from about 2.3, and most preferably about 2.2.

Id. at 22:37–47.

[A] buffer . . . provide[s] for increased acid content at a desired pH . . . [and] can be added to the concentrate to adjust and/or maintain the pH at a level at which the flavoring is not significantly degraded so as to create off flavors. The buffered concentrate contains substantially more acid than a similar, non-buffered concentrate at the same pH.

Id. at 22:51–59. Suitable buffers include sodium citrate and potassium citrate (*id.* at 23:29–30), and “the preferred acid:buffer ratio can be about 1:1 or higher, in one aspect between about 1:1 to about 60:1” (*id.* at 23:5–7).

D. Illustrative Claim

Petitioner challenges claims 1–29 of the ’557 patent. Claims 1, 15, and 23 are independent claims. Claim 1, reproduced below, is illustrative.

1. A packaged flavored liquid beverage concentrate comprising:

a container body having a closed bottom end, a top end with a neck defining an outlet opening and a sidewall extending between the top and bottom ends to define an interior of the container body accessible through the outlet of the top end, the sidewall being flexible and resilient, the sidewall including opposing front and rear walls and a pair of opposing end walls extending therebetween, the opposing front and rear walls having a maximum width that is greater than a maximum width of the end walls;

a flavored liquid beverage concentrate in the interior of the container body comprising:

about 30 to about 65 percent water by weight;

about 15 to about 30 percent acid by weight;

up to about 10 percent buffer by weight, the buffer selected from the group consisting of a potassium salt of an acid, a sodium salt of an acid, and combination thereof; and about 1 to about 30 percent flavoring by weight,

the concentrate having a pH of about 1.9 to about 2.4^[4] and a viscosity of about 1 to about 75 cP when measured at 20° C., and the concentrate having a concentration such that, when diluted at a ratio of about 1:75 to about 1: 160 to provide a beverage, the concentrate delivers about 0.01 to about 0.8 percent acid by weight of the beverage made by the flavored beverage concentrate;

a lid attached to the neck of the container body and defining an exit path aligned with the outlet opening of the container body and through which the flavored liquid beverage concentrate can be dispensed; and

a valve supported by the lid and disposed in the exit path, the valve movable from a closed position, whereby flow of

⁴ Independent claims 15 and 23 have a similar limitation, stating “the amount of acid and buffer selected to provide a pH of less than about 2.4” and “the amounts of acid and buffer selected to provide the concentrate with a pH of less than about 2.4,” respectively.

flavored liquid beverage concentrate through the exit path is substantially blocked when the sidewall of the container body is unsqueezed, to an open position, whereby the flavored liquid beverage concentrate from the interior of the container body can be dispensed in a jet when the front and rear walls of the sidewall of the container body are squeezed.

Ex. 1001, 36:64–37:37.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142–46 (2016) (concluding that 37 C.F.R. § 42.100(b) “represents a reasonable exercise of the rulemaking authority that Congress delegated to the Patent Office”). Under that standard, claim terms are generally given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Petitioner asserts constructions for the following claim terms, “having a pH of about 1.9 to about 2.4,” “flavoring,” and “drip index value.” Pet. 21–23. Patent Owner asserts that we need construe no claim term. PO Resp. 19–20. We agree with Patent Owner that no claim term requires

express construction for purposes of rendering a final written decision in this trial.

B. The Prior Art

1. Lohrman (Ex. 1004)

Lohrman discloses a container “particularly adapted for dispensing fluid products” (Ex. 1004, 2:57–59), and designed to “dispense product in a neat fashion” (*id.* at 1:64). Lohrman’s container comprises, in relevant part:

[A] resiliently and flexibly deformable bottle having an overcap with a self sealing dispensing valve having slits and normally being in a concave sealed position. A pivotal lid forming part of the overcap covers and protects the valve during storage and shipment. In use by a consumer, the lid is initially pivoted to an open position to expose the valve. The bottle is then inverted and may be squeezed by applying manual forces for purposes of generating internal pressures that exceed a threshold value to effect shifting of the valve from an inwardly concave sealed position before it will dispense any product through its slits. When the threshold value is exceeded, the valve undergoes movement from the inwardly concave position, to an open outwardly convex position. When the squeezing forces are released, the internal pressures are reduced causing the valve to return towards its inwardly concave position, to effectuate product cut-off. During this return there is a momentary inward opening of the valve enabling venting of the bottle interior to occur. The valve will quickly return to its sealed leak-proof position and the dispensing package can remain in its inverted position without fear or concern over leakage of product.

Id. at 1:42–62.

Figure 9 of Lohrman is reproduced below:

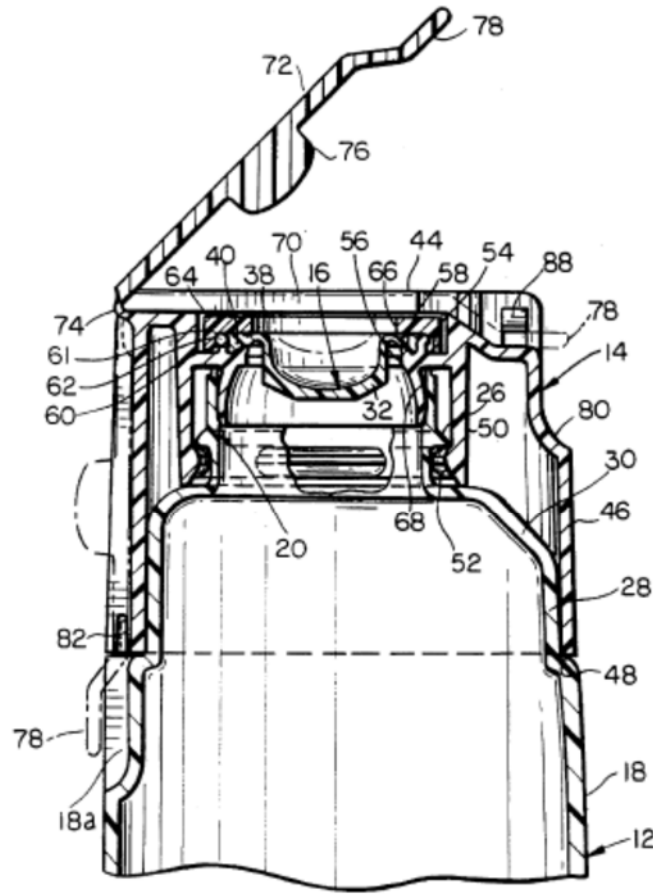


FIG. 9

Figure 9 is a cross sectional view of Lohrman's dispensing package showing self-sealing dispensing valve 16 and valve head 32. Ex. 1004, 3:40-46.

Figure 6 of Lohrman, reproduced below, is a fragmentary top plan view of the self-sealing dispensing valve of Lohrman's flexibly deformable bottle.

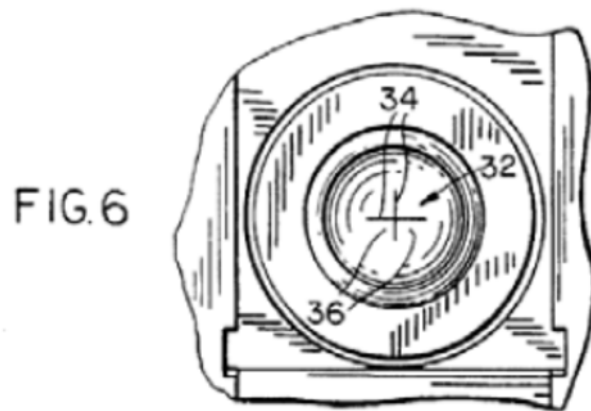


Figure 6 depicts Lohrman's self-sealing dispensing valve comprising "a one-piece integrally molded member preferably constructed from liquid silicone rubber, or the like." Ex. 1004, 3:22–24. "The valve includes a concave valve head 32 with cross slits 34 defining [four] pie-shaped flaps 36 and a discharge orifice therein." *Id.* at 3:24–26.

2. Ackilli (Ex. 1005)

Ackilli teaches that beverage concentrates typically include water-insoluble solids, such as flavor compounds, taste modifiers, nutrients and colors, which "may be dispersed in non-aqueous solvent systems to form solutions" (Ex. 1005, 1:22–24). "[W]hen such solutions are added to an aqueous finished beverage," however, "the water-insoluble solids precipitate, crystallize or oil-off due to the overall dilution of the non-aqueous solvent in which the solids were dispersed." *Id.* at 1:24–26.

According to Ackilli, "many approaches have been taken to address this problem" (*id.* at 2:5–6), but have "associated disadvantages" (*id.* at

2:18). “For example, beverages containing encapsulations or emulsions are not optically, visually, clear, i.e., water clear.” *Id.* at 2:18–20.

Ackilli discloses a flavoring composition concentrate formulated to “achieve rapid dissolution . . . in cold water” (*id.* at 3:8–9) that avoids this problem and results in a “stable, clear beverage” upon dilution (*id.* at 3:5–9). The flavoring composition concentrate comprises “a flavor, a solvent system, a flavor carrier system, and a densifier” (*id.* at 4:7–8), where “[t]he densifier is an acid modifier present in an amount such that it optimizes the rate of dispersion of said concentrate in water” (*id.* at 4:7–10). Suitable acid modifiers . . . include, for example, citric acid, malic acid, tartaric acid, phosphoric acid . . . and any combinations thereof. *Id.* at 7:4–7.

In a preferred embodiment, the densifier is an acid modifier used in combination with potassium citrate. In a more preferred embodiment, the densifier is citric acid and potassium citrate. Citric acid is preferably present in the flavoring composition in an amount about 5 wt.% to about 20 wt.% of the total weight of the composition. Potassium citrate is preferably present in the flavoring composition in an amount about 2 wt.% to about 5 wt.% of the total weight of the composition.

Id. at 7:9–14.

Finally, Ackilli discloses that its flavoring composition concentrate preferably has a viscosity of about 2.5 to about 5 centipoise (*id.* at 16:1–2), but does not disclose the pH of any of its concentrates or discuss pH at all.

C. Asserted Obviousness over Ackilli and Lohrman

Petitioner challenges claims 1–29 as rendered obvious over Ackilli and Lohrman.⁵ Pet. 3, 25–60. In support of this ground of unpatentability, Petitioner provides a detailed explanation, as well as a claim chart, as to how each claim limitation is taught. *Id.* at 24–60. Petitioner also relies on the Declaration of Kimberly L. Ferruzzi (Ex. 1010), a senior flavorist employed by Heartland Food Products Group, and the Declaration of Dr. Robert Kimmel (Ex. 1011), an associate professor of packaging science at Clemson University. *Id.* at 25–60.

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art;

⁵ Petitioner also had asserted two other pieces of art for this challenge, but we found in our Decision on Institution that there was no rationale for one of skill in the art to combine either of the two references with Ackilli. Instit. Dec. 19 (“We also agree with Patent Owner that Petitioner has not established that Stevens ’486 would have given one of ordinary skill in the art a reason to prepare Ackilli’s concentrates with up to 25% citric acid and as little as about 1% potassium citrate, or that Stevens ’864 would have provided a reason to prepare Ackilli’s concentrates with up to about 30% citric acid and as little as about 0.2% potassium citrate.”) (citing Prelim. Resp. 34–35, 41).

(2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In that regard, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; see *Translogic*, 504 F.3d at 1259. The level of ordinary skill in the art may be reflected by the prior art of record. See *Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

1. Level of Skill

A person of ordinary skill in the art is defined as “a hypothetical person who is presumed to know the relevant prior art.” *GPAC*, 57 F.3d at 1579 (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus, Inc.*, 807 F.2d 955, 962 (Fed. Cir. 1986)). Some of the factors to consider in determining the level of ordinary skill may include: (1) type of problems encountered in the art; (2) prior art solutions to those problems; (3) rapidity with which innovations are made; (4) sophistication of the technology; and (5) educational level of active workers in the field. *Id.* Not every factor need be present, and one or more factors may predominate the determination. *Custom Accessories*, 807 F.2d at 962–63.

Ms. Ferruzzi states that one of skill in the art included at least the ability to make the subject matter disclosed in Ackilli. Ex. 1010 ¶¶ 12–13; Pet. 24–25. Ms. Ferruzzi also states that one of skill in the art at the time of the invention also would have the ability “to make predictable use of the compositions and materials described” in Ackilli, and also have the education and experience in food chemistry to have knowledge of the information in Ackilli. Ex. 1010 ¶¶ 12–13; Pet. 25 (adding the ability to make predictable use of the containers described in the art such as Lohrman).

Dr. Marvin J. Rudolph, Patent Owner’s declarant, disagrees with Ms. Ferruzzi’s assessment of the level of skill. Ex. 2012 ¶¶ 20–22. Dr. Rudolph asserts that one of skill in the art at the time of the invention would have “at least a Bachelor of Science in Food Science, Chemistry, or Chemical Engineering and at least five years of experience in the design and formulation of consumer beverage products” and “a Bachelor of Science in a packaging science or Mechanical Engineering or at least five years of experience in the design and manufacture of consumer product packaging.” Ex. 2012 ¶ 21. It is not apparent that Ms. Ferruzzi’s and Dr. Rudolph’s definitions relating to flavored beverage liquid concentrates are necessarily disparate. In reviewing the ’557 patent and Ackilli and applying the factors set forth above from *Custom Accessories*, we find that one of skill in the art who has the education and experience in food chemistry to understand Ackilli and the ’557 patent and can make predictable use of such

information, would have at least a Bachelor of Science in Food Science, Chemistry, or Chemical Engineering and at least five years of experience in the design and formulation of consumer beverage products.

Two additional experts proffered by the parties also opine on the level of skill required: Patent Owner's declarant, Dr. S. Paul Singh, and Petitioner's declarant Dr. Robert M. Kimmel. *See* Exs. 1011, 2018. Similar to Ms. Ferruzzi's assessment of the level of skill, Dr. Kimmel states that one of skill in the art would be able to make predictable use of the elements and techniques disclosed in the references relating to containers, including routine design choices. Ex. ¶¶ 14–15.

Dr. Singh disagrees with Dr. Kimmel's definition of one of skill in the art because Dr. Singh believes "it is possible to provide objective criteria for assessing whether a person is of ordinary skill in the art of the subject matter claimed in the '557 patent." Ex. 2018 ¶ 14. Dr. Singh agrees with Dr. Rudolph's definition of one of skill in the art as set forth above.

As we found for the appropriate level of skill in the art proposed by Ms. Ferruzzi and Dr. Rudolph, Dr. Singh's and Dr. Kimmel's definitions are not necessarily disparate and would include someone with the level of education and skill proposed by Dr. Singh, *see* Ex. 2018 ¶¶ 14–15, but such a person of skill would also meet the requirements set forth by Dr. Kimmel, *see* Ex. 1011 ¶¶ 14–15.

2. *Decision on Institution*

In our Decision on Institution, we recognized that Ackilli does not set forth the pH of any of its disclosed concentrations, and Petitioner has not established that the pH of any of Ackilli's working samples met the requirements of the challenged claims. Dec. Instit. 12, 18. Therefore, we agreed with Patent Owner that Ackilli does not expressly or inherently disclose concentrations meeting the pH range of the challenged claims. *Id.* at 18–19.

We also recognized that Ackilli was concerned with the effect of an acid densifier on the dispersal rate of its concentrate upon dilution with water, but did not discuss the pH of the concentrate. Dec. Instit. 20. We noted, however, that Petitioner had provided evidence in its Sample 6, disclosed in Ms. Ferruzzi's Declaration, that a berry-flavored concentrate containing 20% acid and 2% buffer, with a pH of 2.24, falls within the ranges disclosed in Ackilli and the ranges recited in the challenged claims of the '557 patent. *Id.* at 20. We also noted that nothing in Ackilli "makes the concentrate of Petitioner's Sample 6 any more or less inventive than any of Ackilli's actual working examples." *Id.*

Relying on *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003) involving the obviousness of overlapping ranges, we stated that Patent Owner could show that the particular claimed ranges are critical by showing that the claims ranges achieve unexpected results relative to the prior art

range. *Id.* at 21. We also noted that the new and unexpected results must be different in kind, and not merely in degree from the prior art. *Id.*

We also were persuaded that Lohrman taught a container from which liquid could be dispensed “in a jet” when the container is squeezed, and that Petitioner had shown a sufficient reason for combining Lohrman’s container with Ackilli’s beverage concentrate. *Id.* at 22–23.

3. *Petitioner’s Arguments*

Petitioner asserts that Ackilli discloses flavoring composition concentrates comprising “a flavor, a solvent system, a flavor carrier system, and a densifier” (Pet. 29–30 (citing Ex. 1005, 1:10–12, 4:5–10, 5:9–7:14)), which “can be an acid (such as citric acid, malic acid, or phosphoric acid) in combination with potassium citrate” (*id.* at 30 (citing Ex. 1005, 7:1–15)). Petitioner asserts that Ackilli “discloses water, acid, buffer, and flavor concentrations, and ratios between such concentrations that fall within the ranges claimed in Claim 1.” *Id.* (citing Ex. 1005, 7:1–15, 14:15–15:17).

In particular, Petitioner asserts that

Ackilli discloses flavored beverage concentrates having a pH of about 1.9 to about 2.4 . . . insofar as pH is merely a physical property of the compositions of Ackilli, in which citric acid is preferably present in an amount about 5 wt.% to about 20 wt % of the total weight and potassium citrate is preferably present in an amount about 2 wt.% to about 5 wt.%.

Id. at 27.

Petitioner additionally provides evidence that a berry-flavored concentrate containing 20% acid and 2% buffer—not expressly disclosed by

Ackilli, but produced within the boundaries of Ackilli's disclosure—has a pH of 2.24. *See* Ex. 1010 ¶¶ 115–117, App. B (Sample 6).

Petitioner asserts that Lohrman discloses all the limitations of the container of claim 1, including the requirement that liquid “from the interior of the container body can be dispensed in a jet when the front and rear walls of the sidewall of the container body are squeezed.” Pet. 28 (citing Ex. 1004, 1:49–58, 3:37–46, Fig. 9; Ex. 1013, 2:52–58, 12:5–15, Figs. 3, 13).

Finally, Petitioner contends that “[a] person of ordinary skill in the art would recognize that Lohrman has features that are ideal for the storage and dispensing of a liquid beverage concentrate” (Pet. 29), and “would have reason to use the concentrate disclosed in Ackilli . . . in the container of Lohrman” (*id.* at 34).

4. *Patent Owner's Arguments*

Patent Owner points out that the problems addressed by the '557 patent and Ackilli are different; the '557 patent addresses providing an ultra-concentrated, low-pH, shelf-stable liquid beverage composition in a portable, convenient, multi-serving container, whereas Ackilli is concerned with achieving quick dispersion of concentrates in water, a problem not related to pH. PO Resp. 1–2, 16 (describing Ackilli's concentrate that is pasteurized and “packaged hot”), 17 (describing Ackilli's use of an acid modifier, such as citric acid, as a densifier to optimize the rate of dispersion). Patent Owner posits that one of skill in the art would not look to Ackilli, which does not mention pH at all, to solve the problems addressed

in the '557 patent. *Id.* at 2. Patent Owner asserts that, in instituting this *inter partes* review,

[t]he Board did not require Petitioner to show any reason that would have led a POSA to even look to Ackilli to solve the problems addressed by the '557 Patent, much less to locate and choose that single combination of weight-percentage values from among Ackilli's multiple broad ranges.

The Board should have required Petitioner to establish a specific reason that would have prompted a POSA to choose that particular combination of values from within Ackilli's ranges.

PO. Resp. 3.

Patent Owner offers several reasons why *Peterson* is not applicable. First, *Peterson* does not apply when the result effective variable is not expressly disclosed or recognized in the prior art. PO Resp. 3, 4 (citing *In re Antonie*, 559 F.2d 618, 620 (C.C.P.A. 1977); *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012)), 20–21, 22–23, 26 27. For instance, Patent Owner states that

Peterson's "typical" case is one where the prior art expressly discloses an overlapping range for *each* of the claimed ranges, not where (as here) the prior art (Ackilli) does not mention, disclose a specific range for, or identify as result-effective the variable (pH) that is described as critical in the challenged patent and is narrowly specified in its claims.

Id. at 3. Patent Owner states that "[r]ecognizing a causal relationship between the variable in question and the desired result is 'essential to the obviousness of conducting experiments' to find the optimum value for that

variable.” *Id.* at 22–23 (citing *Antonie*, 559 F.2d at 620). Patent Owner concludes that because there is *no* disclosure in Ackilli of a relationship between pH and Ackilli is only concerned with rapid dispersion of the concentrate in water, “a POSA would have had no reason to experiment with Ackilli’s ranges to try to identify some optimum pH within those ranges.” PO Resp. 27–28; *see also* PO Resp. 30 (explaining POSA would find Ackilli teaches that varying either citric acid or potassium citrate concentrations increases the density of the composition indicating that density is not pH-dependent (citing Ex. 2012 ¶¶ 92–93)).

Patent Owner asserts that the pH ranges in the challenged claims do not “merely define an inherent property present in all compositions with acid, buffer, flavoring, and water in amounts that fall within the specified weight percentages. . . . [T]he claimed weight-percentage ranges could be manipulated to create compositions with pH values as high as 3.45.” PO Resp. 25 (citing Ex. 2012 ¶ 102).

Even if *Peterson* applies, Patent Owner asserts that its presumption that one of skill in the art would seek to identify an “optimum” value of a variable within a prior art range by routine experimentation does not apply because the range for pH in the composition that can be made using Ackilli’s weight-percentage value ranges for the ingredients is so broad. PO Resp. 5, 23 (citing *Genetics Inst., LLC v. Novartis Vaccines & Diagnostics, Inc.*, 655 F.3d 1291, 1306 (Fed. Cir. 2011) (finding *Peterson* inapplicable because the

disclosed range was too broad to invite routine optimization)), 23–24, 31–34.

Patent Owner states that Ackilli’s many possible combinations of ingredients within the disclosed ranges would lead to a range of pH values of 1.21 up to 4.12, encompassing an extremely broad range. *Id.* at 5, 27, 33–34 (citing Ex. 2012 ¶ 85, 148, 149, 152, 153, 156 (showing Ackilli’s compositional ranges can produce pH values as low as 1.21 (possibly as low as 0.62 if phosphoric acid is used at the high end of Ackilli’s range with no buffer) and as high as 4.12)), 33 (stating, “Dr. Rudolph opines that a POSA would consider that to be a pH range of extremely large breadth.”). Patent Owner concludes that

Because *Peterson*’s “routine optimization” and presumption of obviousness do not apply here, Petitioner still bears the standard burden of articulating a specific reason for choosing the claimed combination of weight-percentage and pH values from Ackilli’s broad compositional ranges.

Id. at 5.

Petitioner has not shown any such motivation to select possible combinations of ingredients in the ranges provided in Ackilli that result in the claimed pH range, Patent Owner asserts, with any reasonable expectation of success. *Id.* at 5–6, 23. In fact, Patent Owner points out that Ms. Ferruzzi provided a single example, Sample 6, which had specific weight percentages for the ingredients that she did not choose, that indicates impermissible hindsight because

“[P]resented only with [Ackilli]” and “guided by the then-accepted wisdom in the art,” a POSA at the time of the invention would have had no reason to think that including “higher amounts of citric acid” and “lower amounts of sodium citrate or potassium citrate buffers” would “improve[]” the qualities of Ackilli’s compositions, as Petitioner suggests. Indeed, that suggestion “appears to be premised on Petitioner’s knowledge of the . . . patent itself.”

PO Resp. 38 (citing Pet. 30); *see also id.* at 31 (stating Sample 6 used the least amount of buffer according to Ackilli’s range contrary to Ackilli’s teaching that dispersion time is shortened as more buffer is added), 40–41.

Patent Owner points to Petitioner’s single statement in support of a motivation for its obviousness contention, citing to no documentary or testimonial evidence, that the general knowledge available at the time of the invention would have taught that including higher amounts of citric acid and lower amounts of sodium citrate or potassium citrate buffers in Ackilli’s compositions would improve their taste, palatability, and keeping qualities and would stabilize their flavor and color. PO Resp. 34–35, 39–40 (refuting Petitioner’s assertion that choosing higher amounts of citric acid would improve the taste of Ackilli’s compositions when Ackilli describes concentrates that are distributed in single serving packages versus diluting at a high ratio as described in the ’557 patent), 40 (refuting higher acid and lower buffer amounts would improve keeping qualities of Ackilli when Ackilli teaches pasteurization at very high temperatures and packaging hot to maintain biological integrity). Patent Owner states that such general knowledge cannot substitute for documentary evidence for core factual

findings in a patentability determination. *Id.* at 35–36 (quoting *K/S HIMPP v. Hear-Wear Techs., LLC*, 751 F.3d 1362, 1366 (Fed. Cir. 2014)).

Patent Owner also asserts that neither Lohrman nor Brown, which Lohrman incorporates by reference, teaches or suggests a container capable of dispensing its contents in a jet. PO Resp. 46–48.

Patent Owner also provides evidence of unexpected results and commercial success. *Id.* at 7, 24, 56–60. Patent Owner asserts that a lack of degradation of artificial flavorings and sweeteners when kept at ambient temperatures at the low pH in the range of “about 1.9 to about 2.4,” was unexpected. *Id.* at 7, 56–58 (citing Ex. 2012 ¶ 99). Patent Owner asserts that the claimed pH range defined a surprising “sweet spot” where the highly concentrated liquid compositions of the invention were acidic enough to provide the desired tartness upon dilution and to resist microbial growth at ambient temperatures while also retaining a stable flavor when stored at room temperature for several months. PO Resp. 1–2, 25.

5. *Petitioner’s Reply*

Petitioner counters that the single, unexpected result that Patent Owner identifies, absence of flavor degradation during a three-month period at ambient temperatures, was not unexpected as of the critical date. Reply 2. Petitioner states that “[u]pon cross-examination, Kraft’s witnesses were exposed as uninformed and unable to say whether, **in fact**, the flavored beverage concentrates claimed in the ’557 patent achieved flavor stability levels that differed even in degree, much less in kind, from flavor stability

levels that Ackilli concentrates achieved.” *Id.* at 2; *see id.* at 2–9 (discussion regarding cross-examination of Drs. Rudolph, Ragnarsson, and West).

Petitioner offers a declaration of Joseph A. Ackilli, an inventor on the reference asserted against the claims of the ’557 patent. *See* Ex. 1202, Reply 9–14. Petitioner offers Mr. Ackilli’s Declaration to describe how beverage concentrates were developed prior to the critical data, and counters Patent Owner’s assertion that flavored concentrates as claimed in the ’557 patent achieved new or unexpected results as compared to those Mr. Ackilli developed and disclosed in Ackilli. Reply 9. Petitioner also offers evidence from Mr. Ackilli’s Declaration that Water Sensations, Inc. commercialized Mr. Ackilli’s flavored concentrates described in Ackilli. *Id.*

Mr. Ackilli testifies that the pH ranges claimed in the ’557 patent “are naturally associated with certain taste profiles.” Reply 11 (citing Ex. 1202 ¶ 71). Mr. Ackilli points out that the choice of a densifier will

often result in concentrates having a pH between about 1.9, and about 2.4, as the peach and orange-flavored WATER SENSATIONS concentrates demonstrate; further, because taste profile of a concentrate is the principal determinant of its pH value, developing a desired taste profile will often lead to concentrates having the claimed pH range.

Reply 13.

Petitioner also asserts that Lohrman discloses a container capable of dispensing its contents in a jet. Reply 15–17.

a. Proper Scope of the Reply

Patent Owner asserted during oral argument that “whatever Ackilli taught or whatever one of skill in the art was supposed to be able to recognize in Ackilli should have been in the Petition.” Tr. 34:23–23. We agree; Petitioner’s assertion of and reliance on Mr. Ackilli’s testimony to establish what one of ordinary skill in the art would have gleaned from Ackilli should have been in the Petition. See 35 U.S.C. § 312(a)(3) (stating that the petition must identify in writing and with particularity the evidence that supports the grounds for the challenge to each claim including affidavits or declarations of supporting evidence and opinions that petitioner relies upon).

The fact that an argument may be responsive to Patent Owner’s arguments set forth in its Response does not relieve the Petitioner of its initial burden to identify “with particularity” the “evidence that supports the grounds for the challenge to each claim.” *Maxlinear, Inc. v. Cresta Tech. Corp.*, Case IPR2015-00594, slip op. at 29 (PTAB Aug. 15, 2016) (quoting *Intelligent Bio-Systems*, 821 F.3d 1359, 1367–68 (Fed. Cir. 2016)); see also 37 C.F.R. § 42.104 (describing required content of the Petition).

In challenging the patentability of the claims of the ’557 patent as set forth in the Petition, the Petitioner relies on Ackilli to teach inherently the ’557 patent’s claimed pH range of 1.9 to 2.4. For instance, Petitioner states in the Petition that

Ackilli discloses flavored beverage concentrates having a pH of about 1.9 to about 2.4, in that the composition of Ackilli

imparts a palatable flavor to water and insofar as pH is merely a physical property of the compositions of Ackilli, in which acids such as citric acid, phosphoric acid, and malic acid are disclosed at about 5 to 20 wt % and potassium citrate buffer is disclosed at about 2 wt % to about 5 wt %.

Pet. 27.

We rejected this inherency theory in our Decision on Institution. We recognized that Ackilli does not disclose the pH of any of its disclosed concentrations, and Petitioner had not established that the pH of any of Ackilli's working samples met the requirements of the challenged claims. Dec. Instit. 18–19. Therefore, we agreed with Patent Owner that Ackilli does not expressly or inherently disclose concentrations meeting the pH range of the challenged claims. *Id.*

In the Declaration submitted with Petitioner's Reply, Mr. Ackilli offers a new theory for how Ackilli teaches the claimed pH range. Mr. Ackilli testifies that the pH of a beverage is driven by the desired taste profile of the finished beverage and relies on alleged commercial embodiments of the Ackilli reference to prove that the beverage concentrates described in Ackilli included beverage concentrates with a pH in the claimed range. Ex. 1202 ¶¶ 55–61. Including such a new theory and new evidence concerning what a reference teaches is inappropriate at the reply stage. See 35 U.S.C. 312(a)(3); 37 C.F.R. § 41.104.

Also, the evidence of the pH of alleged embodiments of the Ackilli reference on sale before the critical date, such as the peach and orange-flavored Water Sensations, is beyond the scope of this *inter partes*

proceeding because such evidence is not a patent or printed publication. See 35 U.S.C. § 311(b) (stating the scope of an *inter partes* review is limited to challenges under §§ 102 or 103 and “only on the basis of prior art consisting of patents or printed publications”); Tr. 32:24–33:14 (asserting that Water Sensations evidence is beyond scope of Petition).

We will not consider paragraphs 11–31, 33–42, 55–59, 61, 65, and 67–71 of Mr. Ackilli’s declaration elaborating on this new theory or the evidence of the alleged embodiments of the Ackilli reference, the peach and orange-flavored Water Sensations, which is beyond the scope of this proceeding.⁶

6. Analysis

Turning to the substantive arguments made concerning the patentability of claims 1–29 of the ’557 patent, in reviewing all the arguments and evidence, we agree with Patent Owner that *Peterson* does not apply in this case. *Peterson*’s presumption arises when claimed ranges

⁶ Even were we to consider Mr. Ackilli’s Declaration, we find that the lack of evidentiary support for many of the statements made in his declaration would render the information provided in the Declaration of limited probative value. See, e.g., Ex. 1202 ¶ 58 (providing no support for statements concerning “making a beverage concentrate whose pH was within the range of about 1.9 to about 2.4 was a design step that was well within the skill of a person who could practice Ackilli as of September 10, 2008” and “Ackilli also discloses at least two reasons to make concentrates having high acid content and a pH of between 1.9 and 2.4, namely, to achieve a desired taste profile, and to improve dispersion in the fluid to which it is added.”).

overlap or are encompassed by *disclosed* ranges in the prior art. *See Peterson*, 315 F.2d at 1329–30 (“Selecting a narrow range from *within* a somewhat broader range disclosed in a prior art reference is no less obvious than identifying a range that simply *overlaps* a disclosed range.”). The overlap itself of the disclosed ranges and the claimed ranges provides sufficient motivation to optimize the ranges because of the “normal desire of scientists or artisans to improve upon what is already generally known.” *See Peterson*, 315 F.3d at 1330. Here, Ackilli, which addresses optimizing dispersion of its flavoring composition concentrates in water, does not mention pH, much less disclose a pH range for the flavoring compositions. *See Ex. 1003*, 1:10–13.

Also, it is clear that Ackilli did not recognize pH as a result-effective variable for compositions as it did not discuss pH. Only if a variable is known to be result-effective is the optimization of the variable within the grasp of one of ordinary skill in the art. *Applied Materials, Inc.*, 692 F.3d at 1295 (citing *Antonie*, 559 F.2d at 620); *In re Boesch*, 617 F.2d 272, 276 (CCPA 1980)). Because the *Peterson* presumption does not apply here, we need to identify where Petitioner offered some articulated reasoning with some rational underpinning to support a conclusion of obviousness. *See KSR*, 550 U.S. at 418.

As we noted in our Decision on Institution, Petitioner offered one example of a composition meeting the requirements of Ackilli and the challenged claims of the ’557 patent. Sample 6, disclosed in Ms. Ferruzzi’s

Declaration, describes a berry-flavored concentrate containing 20% acid and 2% buffer, with a pH of 2.24, that falls within the ranges disclosed in Ackilli and the ranges recited in the challenged claims of the '557 patent. Dec.

Instit. 18. In describing Sample 6, Ms. Ferruzzi stated that she had prepared the flavoring composition, Sample 6, in accordance with the disclosure of Ackilli and that Sample 6 met the limitations of the challenged claims.

Ex. 1010 ¶¶ 23, 78, 115–117.

Ms. Ferruzzi testified that counsel provided her with the formulation for Sample 6, and she did not have any input into the formulation except for choosing the flavor. *See* Ex. 2014, 60:22–61:10, 62:23–64:24. Ms. Ferruzzi also offered that a person of ordinary skill in the art would know that

improved taste (including a lasting taste impression and desirable body), improved palatability, improved keeping qualities, and stabilized flavor and color may be achieved by modifying the compositions of Ackilli to include higher amounts of citric acid and lower amounts of sodium citrate or potassium citrate buffers that result in compositions falling within the scope of the claim.

Ex. 1010 ¶ 25. Ms. Ferruzzi, however, cites only two references in support, references that we found a person of ordinary skill would not look to when seeking to modify Ackilli's beverage concentration. Dec. Instit. 19; *see* PO Resp. 35 n.7. Without further support as to what one of skill in the art would have known, we do not credit this testimony.

We find that Petitioner has failed to provide a reasonable explanation as to why one of skill in the art would modify the ranges of weight-

percentage values for the components of flavor compositions in Ackilli to arrive at the narrow pH range of the challenged claims of the '557 patent. We need not reach the parties' arguments concerning the valve limitation of the challenged claims.

Having considered the information presented in the Petition, Patent Owner's Response, Petitioner's Reply, and the supporting evidence, we find that Petitioner has failed to show by a preponderance of the evidence that challenged claims 1–29 are unpatentable over Lohrman and Ackilli.

D. Petitioner's Motion to Exclude

Petitioner moves to exclude portions of Dr. Rudolph's Declaration (Ex. 2012) "insofar as those paragraphs purport to characterize the knowledge, expectations, or 'conventional wisdom' held by persons skilled in the art of [the '299 patent] with respect to the stability of flavoring compositions in aqueous solutions having a pH of between about 1.9 and about 2.4." Paper 43, 1. Petitioner explains that this evidence should be excluded because Dr. Rudolph admitted that Dr. Rudolph's assertions are not based on his knowledge or experience. *Id.*

Patent Owner responds that Dr. Rudolph is qualified in the pertinent art, and any failure to recite degradation mechanisms of certain flavorings, which involves "incredibly complex, highly technical information" does not render Dr. Rudolph's testimony inadmissible. Paper 50, 1–5.

As Patent Owner notes, we are "well positioned to determine and assign appropriate weight to evidence presented" to us. We agree that the

arguments presented in Petitioner's Motion to Exclude go to the weight that we give the evidence, and therefore, are an improper basis for excluding evidence.

For this reason, we *dismiss* Petitioner's Motion to Exclude.

E. Patent Owner's Motion to Exclude

Patent Owner moves to exclude paragraphs 11–31, 33–42, 55–59, 61, 65, and 67–71 of Mr. Ackilli's Declaration because it exceeds the proper scope of reply evidence and should have been presented with the Petition. Paper 45, 1. Patent Owner also moves to exclude paragraphs 33–42, 56, 58, 59, 61, 65, 67, and 71 of Mr. Ackilli's Declaration because these paragraphs contain irrelevant information concerning alleged commercial embodiments of Ackilli known as Water Sensations. *Id.* at 2. Finally, Patent Owner asserts that paragraph 12 of Dr. Robert M. Kimmel's Second Declaration (Ex. 1212) and the LaFlamme reference (Ex. 1216) should also be excluded as beyond the proper scope of reply evidence. Paper 45, 1, 14–15.

Petitioner responds that Mr. Ackilli's Declaration is entirely responsive to Dr. Rudolph's testimony. Paper 52, 3–13. Petitioner also states that paragraph 12 of Mr. Kimmel's Second Declaration is also responsive to arguments raised by Patent Owner and its declarants. *Id.* at 14–15.

A motion to exclude is not the proper vehicle for challenging the scope of a reply. *Conopco, Inc. v. Proctor & Gamble Co.*, IPR2013-00505, slip op. at 29 (PTAB Feb. 10, 2015). Patent Owner did raise these issues

properly at oral argument, and we addressed them above. As we have stated above, we will not consider paragraphs 11–31, 33–42, 55–59, 61, 65, and 67–71 because this evidence should have been submitted with the Petition and is untimely in Petitioner’s Reply. We also found that Water Sensations evidence is beyond the scope of this *inter partes* proceeding and will not be considered.

For these reasons, we *dismiss* Patent Owner’s Motion to Exclude.

III. CONCLUSION

For the foregoing reasons, we are not persuaded that the Petitioner has shown by a preponderance of the evidence that claims 1–29 of the ’557 patent are unpatentable under 35 U.S.C. § 103(a).

IV. ORDER

Accordingly, it is

ORDERED that claims 1–29 of U.S. Patent No. 8,603,557 B2 have not been shown by a preponderance of the evidence to be unpatentable;

FURTHER ORDERED that Petitioner’s Motion to Exclude is dismissed;

FURTHER ORDERED that Patent Owner’s Motion to Exclude is dismissed; and

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

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Patent 8,603,557 B2

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